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Studies on the Chironomid Collected on Goto Islands, Western Japan

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Abstract: Collections of chironomid midges were conducted by Suzuki at 3 localities on the Goto Islands situated west of Kyushu, at the side of Wani River on Nov. 28, 1999, at the side of Ohgawara River on Nov. 29, and in the town of Fukue on Nov. 29. Samples of fallen leaves were collected in vinyl bags from bottom of the streams, kept in the laboratory under room temperature, and adult midges emerged from them were individually mounted on slides in gum-chloral medium with our standard method. A total of 29 adult male specimens collected with this method were examined, and were classified into 9 chironomid species, among which 3 are described as new species. Wild adult midges swarming in the air or resting in bushes were also collected during daytime with insect net at the same localities, screened under stereomicroscope for differentiating the species, and 95 adult males among them were mounted on slides. These were classified into 34 chironomid species, and 4 among them are described as new species. The number of species common to these samples collected with the two different methods were only 4, and none of the new species were collected with the two methods, showing that the simultaneous use of these methods are both significant. Of the total of 40 species collected this time, only 11 are considered as in common with those recorded from Europe, Americas and the mainland of Japan, 22 are those already recorded in other areas of Japan but not outside of this country, and 7 are described as new species this time.

Key words: Chironomidae, Goto Islands, medical entomology, new species

MATERIALS AND METHODS

The Goto Islands where the present specimens were collected are situated from about 20 km to 80 km west of Nagasaki Prefecture, Kyushu, and have a population of about 79,000, a total area of 634 square km, and the highest point is 461 meters from sea level. The collections of chironomids were conducted by Suzuki at three localities in the mountainous areas of Fukue Island along the two streams, Wani River and Ohgawara River, and in the town of Fukue. The methods of collections, preservation of specimens, preparing slide-mounted specimens, and methods of descriptions and standard measurements are the same as reported

in our previous papers, and also in "the Monograph of Chironomidae of Japan" compiled by Sasa and Kikuchi (1995, University of Tokyo Press).

A. SPECIES COLLECT BY LABORATORY REARING OF FALLEN LEAVES COLLECTED FROM BOTTOM OF MOUNTAIN STREAMS

Samples of fallen leaves collected from the bottom sediments of Wani River and Ohgawara River on Nov. 29 were preserved in vinyl bags in wet conditions, and were kept in the laboratory under room temperature. The adult males emerged in these bags were mounted individually in gum-chloral medium following our standard method, and were identified as belonging to the following 8 species.

1. *Stenochironomus gotoabeus* sp. nov. (Figs. 1 a-j)

A male, No.395:77, emerged in the laboratory from a sample of fallen leaves collected in the bottom of Wani River on Nov. 29. BL 4.70 mm, WL 2.22 mm, WW/WL 0.30. Body largely pale yellow, only postnotum with a pair of brown spots in the middle portion, tips of femora, abdominal tergite and anal point brown. Head in Fig. 1 a. Eyes bare, ER 0.43. Antenna with 13 flagellar segments, AR 1.35, AHR 0.56. P/H 0.95. SO 19:18, CL 14. Anteprepronotum (Fig. 1 b) narrowly united, without seta. Scutum and scutellum in Fig. 1 c; DM 28, DL 20:23, PA 6:6, SC 26.

Wing bare, bluish but without dark marks, venation in Fig. 1 d. R2+3 largely separated but united to R1 at the tip. VR 1.04, R/Cu 1.20. Anal lobe obtuse. Tip of fore tibia (Fig. 1 e) with a broad and rounded scale bearing 3 long setae. Tips of mid and hind tibiae (Figs. 1 f,g) with two comb scales, both with a spur. Fore tarsi both lost, mLR 0.69, hLR 0.79, mBR 5.1, hBR 5.5. Pulvilli large and brush-like.

Hypopygium in Fig. 1 h. Anal point (also in Fig. 1 i) long, narrow, constricted in the middle and apically rounded, with lateral ridges but without spine clusters. Ninth tergite with numerous long setae arising in the middle portion extending beyond its posterior margin, and also many strong setae on posterior margin flanking anal point. Dorsal and ventral appendages in Fig. 1 j; the former small, rod-like and bearing 5 short setae; the latter very long, strongly curved at about distal 1/3, bearing a large apical spur, and 4 subapical setae. Gonostylus long, narrow, nearly parallel-sided and slightly curved, with 6 long setae along inner margin.

Remarks. This species belongs to genus *Stenochironomus* Kieffer of the tribe Chironomini in general structure, especially in that tips of mid and hind tibiae with two comb scales both with a spur, and in the peculiar structure of dorsal and ventral appendages of hypopygium, the former small and bearing 5 short setae, the latter very long and bearing apical spine and 4 preapical setae. It is somewhat related to *S. hibernicus* (Edwards) among the species of this genus in Europe, in that ventral appendage without lateral seta, and gonostylus is nearly parallel-sided and not tapering towards apex, but *S. hibernicus* differs from the present species in that anal point without lateral ridges and more strongly constricted at about middle, ninth tergite without numerous long setae but only small numbers of

short setae, and gonostylus is almost straight and apically rounded (see Pinder, 1978, Fig. 171B). On the other hand, altogether 10 species were recorded from Japan as members of this genus (Sasa & Kikuchi, 1995, p.120), among which scutum is entirely pale in only 2 species, *S. nubilipennis* Yamamoto, 1981, and *S. okialbus* Sasa, 1990, but in both species wing with conspicuous dark areas and not entirely pale as in the present species. This new species is also characteristic in that postnotum has a pair of dark spots, anteprenotum is united in the middle, and ventral appendage of gonocoxite is extremely long and conspicuously curved.

2. *Polypedilum benokiense* Sasa et Hasegawa, 1988

Six males, No.395:89-94. This species belongs to the *nubeculosum* group of subgenus *Polypedilum*, and was recorded first from Okinawa by Sasa & Hasegawa (1983), and later also from several localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.37).

3. *Polypedilum tamaharaki* Sasa, 1983 (Figs. 5 a-k)

A male, No.395:96, was reared in the laboratory from fallen leaves collected in the bottom of Wani River on Nov. 29. BL 4.62 mm, WL 2.41 mm, WW/WL 0.30. Scutum, scutellum and postnotum almost uniformly dark brown, femora and tibiae of all legs brown, tarsi of all legs pale, abdomen also pale excepting hypopygium being brown. Head in Fig. 5 a. Eyes large, bare, each with a dorsomedial projection, ER 0.16, very small. Antenna with 13 flagellar segments, AR 0.83, AHR 0.49. Palp long, P/H 1.25. SO 23:18, CL 45 (very many). Anteprenotum (Fig. 5 b) slightly separated, without seta. DM 20, DL 26:26, PA 9:7, SC 29 (very many, Fig. 5 c).

Wing (Fig. 5 d) bare, membrane smooth, R2+3 nearly in contact with R1, RR 0.17. VR 1.18, R/Cu 1.18. Tip of fore tibia (Fig. 5 e) with a broad and apically pointed terminal process bearing 3 long setae. Terminal comb scales of tips of mid and hind tibiae (Figs. 5 f,g) fused and with one long spur. fLR 1.65, mBR 0.55, hBR 0.75, fTR 0.30, fBR 2.4, mBR 3.8, hBR 6.8. All legs with a prominent, pad-like pulvilli.

Abdominal tergites with relatively large numbers of setae. Hypopygium in Fig. 5 h. Anal point (also in Fig. 5 i) long, nearly parallel-sided and apically rounded. Ninth tergite with 14 long setae in the middle portion and 4 short setae on posterior margin flanking anal point. Dorsal appendage (Fig. 5 j) composed of a low and relatively narrow base bearing two long inner setae, distal horn slightly curved and apically hooked, with a long lateral seta arising at about distal 1/3. Ventral appendage (Fig. 5 k) long, narrow, and bearing 15 recurved setae and one long, caudally directed apical seta. Gonostylus widest at about middle with 5 long setae on inner margin and one short apical seta.

Remarks. This specimen belongs to the *nubeculosum*-group of genus *Polypedilum*, and the above described structure and measurement data are almost coincident with those of *P. tamaharaki* Sasa, 1983, and is provisionally classified into this species. However, the type specimens differ from the present ones in that abdominal tergites VII and VIII are dark brown and the number of clypeal setae are 27-36.

4. *Polypedilum tamanigrum* Sasa, 1983

Three males, No. 395:74,75,92, were reared from fallen leaves collected at Wani River on Nov. 29. This species belongs also to the *nubeculosum* group of subgenus *Polypedilum*, and is characterized by that dorsal appendage with a lateral seta arising at about basal 1/3. It has been recorded from more than 10 localities in Hokkaido and Honshu (Sasa & Kikuchi, 1995, p.39).

5. *Polypedilum (Polypedilum) tsukubaense* Sasa, 1983

Three males, No. 394:95-97, were reared from fallen leaves collected in Wani River on Nov. 29. This species was recorded first from a stream on Mount Tsukuba, Ibaraki, and later from several localities in Honshu, Kokkaido and Kyushu (Sasa & Kikuchi, 1995, p.39).

6. *Pseudobrillia gotobecia* sp. nov. (Figs. 2 a-k)

Four males, No.394:76, holotype, and No.394:98-100, paratypes, reared from fallen leaves collected in Wani River on Nov. 29. BL 4.04, 4.24, 4.28, 3.68 mm, WL 1.63, 1.94, 2.04, 1.86 mm, WW/WL 0.28, 0.30, 0.29, 0.27. Body almost entirely pale, only hypopygium and legs yellowish. Head in Fig. 2 a. Eyes bare, each with a long, parallel-sided dorsomedial extension, ER 0.35, 32, 33, 30. Antenna with 13 flagellar segments, AR 1.19, 1.22, 1.22, 1.25, AHR 0.62, 0.53, 0.54, 0.59. P/H 1.24, 1.23, 1.21, 1.25. SO 24:26, 26:25, 32:30, 24:23, CL 18, 16, 19, 14. Anteprenotum (Fig. 2 b) slightly separated, with 14:14, 20:18, 19:17, 17:15 setae all along the lateral margin. DM all 0, DL 44:40, 62:59, 52:61, 45:45, PA 16:14, 20:16, 16:18, 16:16, SC 26, 31, 26, 24 (Fig. 2 c).

Wing (Fig. 2 d) entirely clothed in macrotrichia, squama with 16:17, 12:12, 23:21, 16:14 fringe hairs, R2+3 in contact with R1, VR 1.32, 1.35, 1.34, 1.41, R/Cu 1.09, 1.15, 1.14, 1.15. Tip of fore tibia (Fig. 2 e) with a long spur, tip of mid tibia (Fig. 2 f) with two terminal spurs, tip of hind tibia (Fig. 2 g) with two spurs and a comb composed of 8 or 9 free spines. All terminal spurs of tibiae are darkly pigmented and with long barbs on basal half. fLR 0.93, 0.98, 0.94, (very high), mLR 0.52, 0.52, 0.53, .69, hLR 0.56, 0.55, 0.55, 0.79, fTR 0.12, 0.13, 0.13, fBR 2.8, 4.4, 3.0, mBR 4.3, 4.1, 5.3, 5.1, hBR 6.0, 4.8, 6.0, 5.5. Small, brush-like pulvilli present (Fig. 2 h).

Abdominal tergites with very large numbers of setae. Hypopygium in Fig. 2 i. Anal point absent, posterior margin of ninth tergite broadly rounded. Inner lobe of gonocoxite (Fig. 2 j) very long and narrow, apically rounded, inner margin slightly concave and lateral margin slightly convex. Gonostylus very long and narrow, slightly curved inwards, tapering towards apex but apically rounded, without megaseta and with 4 small preapical setae.

Remarks. This specimen belongs to genus *Pseudobrillia* Niitsuma, 1991, since wings are entirely clothed in macrotrichia, anal point absent, inner lobe of gonocoxite long and finger-like, gonostylus also very long, and without megaseta. This genus was created with a single species, *P. komorii*, and it was described with male, female, pupa and larva collected from a small stream in Tochigi Prefecture. In the males, the measurement data were WL 2.1-3.2 mm, AR 1.09-1.45, anteprenotum with 13-29 dorsal and ventral setae, DM 0, DL 39-77,

PA 15-27, SC 22-49, SQ 13-27, VR 1.32-1.52, fLR 0.90-0.96, mLR 0.50-0.58, hLR 0.52-0.56. Therefore, the measurement data of the present specimens are within the above variation ranges. However, it was stated in the original description that the body coloration of the males is "thorax dark brown on scutal vitteae, median anepisternum, preepisternum and postnotum, fore legs largely dark brown, mid and hind legs brown except broad basal portion yellowish brown; sometimes thorax and abdomen entirely pale yellow." On the other hand, all the present specimens are almost entirely pale yellow in body coloration, and we consider more reasonable to create a new species, rather than ignoring such remarkable differences in body coloration. The above decision is made, of course, by considering the possibility of these specimens might be a subspecies or a variation of *P. komorii*.

7. *Rheocricotopus (Paracricotopus) tamabrevis* Sasa, 1983 (Figs. 3 a-k)

A male, No.395:73. BL 1.84 mm, WL 0.96 mm, WW/WL 0.35. Scutal stripes and postnotum dark brown, legs and abdominal tergites brown. Head in Fig. 3 a. Eyes pubescent, without dorsomedial extension, ER 1.38, AR 0.42, AHR 0.48, P/H 1.06. SO composed of 2 inner and 4 lateral groups on both sides, CL 13. Anteprepronotum (Fig. 3 b) united with a point, with 3:4 lateral setae. Setae on scutum and scutellum in Fig. 3 c. DM 11, DL 7:10, PA 5:6, SC 9. Wing (Fig. 3 d) membrane bare, plain, without dark marks, squama with 6:6 fringe hairs, RR 0.39, VR 1.17, R/Cu 1.00. Vein M is very stout and almost in contact with vein R, an unusual character. Vein Cu 2 nearly straight, Tip of fore tibia (Fig. 3 e) with a long (30 μ m) spur, tip of mid tibia (Fig. 3 f) with two short spurs (both 13 μ m), tip of hind tibia (Figs. 3 g,h) with a long (28 μ m) and a short (12 μ m) spur, and a comb composed of 12 free spined. Tarsi of mid and hind legs without terminal spur. fLR 0.64, mLR 0.44, hLR 0.56, fTR 0.15, fBR 1.6, mBR 3.3, hBR 3.8. Large brush-like pulvilli present (Fig. 3 i).

Setae on abdominal tergites (Fig. 3 j) are 18 on I, 22 on II to VI, and 20 on VII and VIII, and those on II to VI are arranged in anterior and posterior transverse rows, characteristic to the subgenus *Paracricotopus*. Hypopygium in Fig. 3 k. Anal point (also in Fig. 3 m) small, entirely clothed in microtrichia, and with 2 or 3 lateral and 1 or 2 basal setae. Inner lobe of gonocoxite (also in Fig. 3 n) nearly rectangular, with 15 marginal setae and microtrichia on the lateral portion. Gonostylus (also in Fig. 3 p) simple, with an acutely angulate preapical tooth.

Remarks. From the above described data, the present specimen is diagnosed as *R. (P.) tamabrevis* Sasa, 1983. This species was first recorded from Tama River, Tokyo, and later from 3 additional localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.58).

8. *Rheocricotopus gotocedeus* sp. nov. (Figs. 4 a-i)

No.395:71, reared in the laboratory from bottom leaves of Wani River collected on Nov. 29, the same samples from which the above specimen belonging to the same genus but different subgenus was obtained. BL 2.54 mm, WL 1.32 mm, WW/WL 0.30. Scutum with black median and lateral stripes and large pale humeral pits, scutellum with black margin and pale in the middle, postnotum black, legs and abdominal tergites yellowish brown. Head in Fig. 4

a. Eyes highly pubescent, reniform, ER 1.14. Antenna with 13 flagellar segments, AR 0.78, AHR 0.47. P/H 1.27. SO 1+3:1+3, CL 14. Anteprenotum (Fig. 4 b) united with a point, with 4:4 lateral setae. Setae on scutum and scutellum in Fig. 4 c. DM 14, DL 8:8, all well developed, PA 3:3, SC 10 in one transverse row.

Wing (Fig. 4 d) bare, very finely granular, squama with 4:4 fringe hairs, anal lobe obtuse, costa slightly extended beyond tip of R4+5. R2+3 separated, RR 0.49, VR 1.14, R/Cu 1.14. Vein M rather narrow as usual. Cu2 nearly straight. Tip of fore tibia (Fig. 4 e) with a long (42 μ m) spur, tip of mid tibia (Fig. 4 f) with two short spurs (15 and 18 μ m), tip of hind tibia (Figs. 4 g,h) with a long (42 μ m) and a short (16 μ m) spur, and a comb composed of 14 free spines. fLR 0.84, mLR 0.60, hLR 61, fTR 0.14, fBR 2.8, mBR 2.9, hBR 3.6. Legs with large pulvilli.

Abdominal tergites with relatively small numbers of setae. Hypopygium in Fig. 4 i. Anal point rather small, triangular, widest at base and tapering towards pointed apex, with 4 lateral and 1 basal setae on both sides. Inner lobe of gonocoxite prominent, rectangularly produced. Gonostylus simple, nearly parallel-sided, without preapical swelling.

Remarks. This specimen belongs also to *Rheocricotopus*, but to the subgenus *Rheocricotopus* s. str., since the general structure is similar to the above species but setae on abdominal tergites are distributed rather randomly, not in two transverse rows as in the above species. Among the previously known species of this subgenus, it is somewhat related to *R. oiraprimus* Sasa, 1991 (TPEP p.72) in that scutum with a large humeral pits and stripes are black, AR is much smaller than 1.0, inner lobe of gonocoxite is large and rectangular, but *R. oiraprimus* is essentially different from the present new species in that WL is 1.66 mm and larger, AR 0.4 and smaller, squama bare, DM absent, and anal point is much larger. The present species differs also from the above species, *R. tamabrevis*, not only the mode of distribution of setae on abdominal tergites which separated the subgenus, in that scutal stripes are black and much darker, BL and WL are larger but WW/WL smaller, AR larger, fLR, mLR and hLR all larger, anal point is apically pointed, and gonostylus without preapical tooth.

9. *Limnophyes minimus* (Meigen, 1818)

Nine males, No.395:81-88, 98. This species was recorded first in Europe, and also from more than 10 localities in Japan (Sasa & Kikuchi, 1995, p. 67).

SPECIES OF WILD ADULT MALES COLLECTED WITH INSECT NET OR LIGHT TRAPS

Abbreviations: SWP, collected in daytime by sweeping with insect net. LT, collected in nighttime by light trap.

1. *Chironomus nipponensis* Tokunaga, 1940

A male, No.394:68, SWP at Ohgawara River on Nov. 29. WL 3.12 mm, WW/WL 0.27, AR 3.33. This species has been recorded from more than ten localities in the mainland of

Japan.

2. *Chironomus salinarius* Kieffer, 1921

Two males, No.394:65,66, SWP at Ohgawara River on Nov. 29. AR 3.19, 3.67, fLR 1.39. WL 2.96, 3.02 mm, WW/WL 0.27, 0.28. Body almost entirely dark brown. This species was collected in Europe and also in Japan mostly from brackish water swamps and rivers.

3. *Chironomus yoshimatsui* Martin et Sublette, 1972

A male, No.394:90, SWP at Fukue on Nov. 29. WL 3.48 mm, WW/WL 0.25, AR 3.32, fLR 1.52. This is a species widely distributed in Japan excepting Okinawa, breeding mostly in rather polluted sewage streams.

4. *Dicrotendipes nervosus* (Staeger, 1839)

Three males, No.394:69, SWP at Ohgawara River, No.394:88,90, SWP at Fukue, all on Nov. 29. This is a species originally recorded in Europe, and has been recorded from several localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.28).

5. *Pentapedilum famibeceum* Sasa, 1996 (Fig. 6 a)

Two males, No.394:67, 70, SWP at Ohgawara River on Nov. 28. BL 4.72, 4.08 mm, WL 2.46, 2.14 mm, WW/WL 0.24, 0.27. Scutal stripes and postnotum black, other scutal areas and scutellum yellow, legs brownish yellow, abdominal tergites largely brown and each with a narrow pale area along posterior margin. Eyes bare, ER 0.29, 0.23. Antenna with 13 flagellar segments, AR 1.87, 1.85, AHR 0.58, 0.58. P/H 1.02, 1.04. SO 20:20, 14:15, CL 35, 42. Anteprepronotum separated, without setae. DM 30, 24, in two rows, DL 40:43, 36:33, in 2 or 3 rows, PA 10:11, 9:9, SC 22, 22.

Wing entirely clothed in macrotrichia, squama with 16:15, 16:12 fringe hairs, RR 0.44, 0.34, VR 1.08, 1.09, R/Cu 1.08, 1.13. Tip of fore tibia with a long and apically pointer scale, tips of mid and hind tibiae with two comb scales, one with a long spur and the other without spur. fLR 1.16 (very small), mLR 0.57, 0.57, hLR 0.67, 0.68, fTR 0.21, fBR 4.3, mBR 4.8, 4.0, hBR 5.8, 6.6. Pulvilli large, brush-like.

Anal point long, highly chitinized, widest at base and tapering towards pointed apex, and curved ventrally. Dorsal appendage (Fig. 6 a) with a base produced acutely backwards, distal horn long, narrow, smoothly curved and without lateral seta. Ventral appendage long, slightly expanded distally, with two long, caudally directed setae arising on an apical tubercle, and 16 long recurved setae arising on distal half of inner margin. Gonostylus stout, lateral margin strongly convex, with 7 long setae on inner margin.

Remarks. The above measurement data and structure are almost coincident with those of *P. famibeceum* Sasa, 1996, originally collected with a light trap at the side of a lake in Family Park, in the suburbs of Toyama City. This is the second record of this species.

6. *Pentapedilum sordens* (van der Wulp, 1874) (Fig. 6 d)

Three males, No.394:71-73, SWP at Ohgawara River on Nov. 28. BL 4.62, 4.82, 4.52 mm, WL 2.40, 2.14, 2.26 mm, WW/WL 0.25, 0.28, 0.27. Scutal stripes and postnotum dark brown, other scutal areas and scutellum yellow, legs and abdominal tergites brown. ER 0.17, 0.24, 0.24, P/H 1.06, 1.08, 1.01. Antenna with 13 flagellar segments, AR 1.911, 1.78, 1.94, AHR 0.57, 0.56, 0.56. SO 20:20, 16:17, 14:14, CL 40, 32, 29. Anteprenotum deeply separated, without seta. DM 24, 22, 25, DL 36:36, 34:33, 42:36, PA 10:8, 8:8, 11:12, SC 22, 23, 23. Wing with macrotrichia very densely on entire surface, squama with 16:12, 18:15, 16:16 fringe hairs, RR 0.30, 0.31, VR 1.04, 1.14, 1.13, R/Cu 1.10, 1.15, 1.10. Tip of fore tibia with a long and sharply pointed scale. Tips of mid and hind tibiae with two comb scales, one with a long spur, the other without spur. fLR 1.23 (relatively low), mLR 0.61, 0.57, 0.55, hLR 0.69, 0.65, 0.66, fTR 0.22, fBR 3.9, mBR 4.3, hBR 6.9. Pulvilli large, brush-like.

Abdominal tergites with large numbers of setae. Anal point highly chitinized, widest at base and tapering towards rounded apex, curved ventrally. Dorsal appendage (Fig. 6 d) with a long lateral seta arising at about basal 1/3 of distal horn, and with a relatively high base bearing 5 long setae. Ventral appendage long, finger-like, bearing two long setae on apical tubercle, and 32 recurved setae on distal 1/3 of dorsal side. Gonostylus strongly expanded at about middle.

Remarks. The above described measurement data and structure of the present specimen roughly fit to those of *P. sordens* (van der Wulp, 1874), originally described in Europe, and also recorded from several localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.35, 109, Plate 25 E).

Key for differentiation of *Polypedilum* species collected on GOTO

see Figs. 5 and 6

- 1- Dorsal appendage composed of a broad, pad-like plate entirely clothed in microtrichia
subgenus *Tripodura* (absent in this collection)
- Dorsal appendage composed of a base, and a distal horn free from microtrichia 2
- 2- Dorsal appendage composed of a long and broad, parallel-sided base entirely clothed in microtrichia and with long seta on posterior margin, and a medially directed distal horn arising on its inner margin subgenus *Uresipedilum*, *P. cultellatum* No.13, Fig. 6 k
- Dorsal appendage composed of a low, narrow base, and a distal horn gradually continuous to it subgenus *Polypedilum* 3
- 3- Dorsal appendage without lateral seta; the *nubifer* group 4
- Dorsal appendage with lateral seta; the *nubeculosum* group 5
- 4- Basal seta absent, AR 1.71-1.81 *P. asakawaense* No.7, Fig. 6 b
- Basal seta present, AR 0.70-1.03 *P. kurobenudum* No.8, Fig. 6 e
- 5- Body almost entirely pale yellow; two inner setae of dorsal appendage arising at about middle of the distal horn, lateral seta arising slightly distal to them; recurved setae on ventral appendage arising at about middle 1/3 of the shaft, distal 1/3 free from recurved setae; AR 1.49-1.70 *tsukubaense* No.12, Fig. 6 i

- Body largely dark brown or black; inner setae of dorsal appendage arising from near the base; recurved setae on ventral appendage arising from tip to distal 1/3 6
- 6- Anteprenotum with 6:6 lateral setae, WL 2.74 mm, AR 2.07, lateral seta of dorsal appendage arising at about middle, gonostylus very stout and widest at about distal 1/3 *P. nubeculosum* No.10, Fig. 6 f
- Anteprenotum without seta, WL smaller than 2.2 mm, AR 0.7-0.8 7
- 7- Lateral seta arising at about middle of distal horn, which is stouter and more strongly curved, basal setae 4, AR 0.69-0.80 *P. benokiense* No.9, Fig. 6 e
- Lateral seta arising at about distal 1/3 of distal horn, which is narrower and less strongly curved, basal setae 2 or 3, AR 0.73-0.80 *P. tamanigrum* No.11, Fig. 6 h

7. *Polypedilum (Polypedilum) asakawaense* Sasa, 1980 (Fig. 6 b)

Two males, No.394:16, 17, SWP at Wani River on Nov. 28. BL 3.88, 3.61 mm, WL 2.14, 1.98 mm, WW/WL 0.33, 0.31. Scutal stripes yellow, other scutal areas and scutellum pale, postnotum brown, legs yellow, abdominal tergites brownish yellow, hypopygium brown. ER 0.27, 0.24, AR 1.71, 1.81 (very high among the *Polypedilum* species collected this time), AHR 0.54, 0.55, P/H 0.90, 0.94. SO 11:11, 12:12, CL 22, 24. Anteprenotum widely separated, without seta. DM 14, 8, DL 9:10, 11:11, PA 4:4, 3:3, SC 16, 12. Wing bare, squama with 10:10, 10:10 fringe hairs, R2+3 in contact with R1, VR 1.20, 1.29, R/Cu 1.23, 1.18. fLR 1.55, mLR 0.62, 0.61, LR 0.78, 0.76, fTR 0.13, fBR 5.3, mBR 7.1, 3.2, hBR 7.3, 3.1. Hypopygium as in the type specimens, dorsal appendage (Fig. 6 b) rectangularly curved, without basal and lateral setae.

Remarks. This species is a member of the *nubifer* group of subgenus *Polypedilum*, and the measurement data and structure are almost coincident with those of *P. asakawaense* Sasa, 1980, collected first from Asakawa River, Tokyo, and differ only in that body coloration is generally paler.

8. *Polypedilum (Polypedilum) kurobenudum* Sasa et Okazawa, 1992

(Fig. 6 c)

Two males, No.394:11,12, SWP at Wani River on Nov. 28. BL 3.56, 3.40 mm, WL 1.71, 2.00 mm, WW/WL 0.32, 0.31. Scutum and postnotum brown, scutellum, legs and abdominal tergites yellowish brown. Eyes bare, ER 0.18, 0.19. Antenna with 13 flagellar segments, AR 0.70, 1.03, AHR 0.36, 0.59. P/H 1.04, 1.07. SO 11:11, 12:13, CL 26, 16. Anteprenotum widely and deeply separated in the middle, without seta. DM 28, 16, DL 24:27, 18:21, PA 7:6, 5:6, SC 22, 21, Wing bare, SQ 18:22, 11:11, R2+3 in contact with R1, VR 1.31, 1.26, R/Cu 1.17, 1.18. Tip of fore tibia with a sharply pointed terminal scale, tips of mid and hind tibia with two comb scales, one with a long spur, the other without spur. fLT 1.76, mLR 0.53, 0.52, hLR 0.70, 0.66, fTR 0.32, fBR 3.6, mBR 4.3, 4.0, hBR 5.7, 3.9. Pulvilli large, brush-like.

Abdominal tergites with relatively large numbers of setae, 94 on I, 90 on II, 86 on III, 88 on IV, 68 on V, VI, 56 on VII, and 48 on VIII. Anal point very long and narrow, almost

parallel-sided and apically rounded. Dorsal appendage (Fig. 6 c) composed of triangular base bearing 2 inner setae, and a narrow, slightly curved distal horn without lateral seta. Ventral appendage long, finger-like, bearing only 6 to 8 recurved setae arising near the tip, and a long caudally directed apical seta. Gonostylus widest at about middle, with 4 long setae on inner margin.

Remarks. This species was recorded with two males collected by insect net at the side of a dam on Kurobe River, Toyama, and this is the second record.

9. *Polypedilum (Polypedilum) benokiense* Sasa et Hasegawa, 1988

(Fig. 6 e)

Three males, No.394:13-15, SWP at Wani River on Nov. 28. Body almost entirely brownish yellow. BL 3.66, 3.64, 3.01 mm, WL 1.80, 2.02, 1.66 mm, WW/WL 0.34, 0.37, 0.37. ER 0.22, 0.20, 0.19, AR 0.80, 0.69, 0.63, AHR 0.34, 0.37, 0.37, P/H 1.05, 1.13, 1.08, SO 16:15, 14:16, 12:12. Anteprenotum widely separated, without seta. DM 21, 27, 23, DL 25:22, 26:26, 25:27, PA 5:5, 6:6, 5:6, SC 22, 23, 20. Wing bare, SQ 20:26, 20:18, R2+3 in contact with R1, VR 1.39, 1.38, 1.35, R/Cu 1.16, 1.16, 1.19. fLR 1.76, 1.56, mLR 0.50, 0.51, 0.52, hLR 0.64, 0.71, 0.67, fTR 0.27, fBR 3.0, mBR 3.4, 4.1, hBR 4.3, 4.9. Dorsal appendage (Fig. 6 e) rather stout basally and rectangularly curved, with 4 basal inner setae and a long lateral seta arising at about middle.

Remarks. This species was originally recorded from Okinawa, and later also from several localities in Honshu (Sasa & Kikuchi, 1995, p.37).

10. *Polypedilum (Polypedilum) nubeculosum* (Meigen, 1804)

(Fig. 6 f)

A male, No.394:94, LT at Ohgawara on Nov. 29. BL 6.04 mm, WL 2.74 mm, both largest among species of this genus collected on Goto this time, WW/WL 0.28. Scutum largely black, but with a pair of large pale humeral pits, scutellum brown, postnotum black, legs brownish yellow, abdominal tergites and hypopygium largely dark brown. Eyes bare, ER 0.26. Antenna with 13 flagellar segments, AR 2.07, AHR 0.62. P/H 1.04. SO 14:14, CL 34. Anteprenotum slightly separated, with 6:6 lateral setae (quite unusual character of this species). DM 20, DL 26:24, PA 9:8, SC 24, all largest among species of this genus. Wing bare, with cloudy marks, SQ larger than 18 (partly damaged), anal lobe nearly rectangular. R2+3 separated, RR 0.32. VR 1.14, R/Cu 1.19. Tip of fore tibia with a broad and rounded scale, tip of mid and hind tibiae with two comb scales, one with a spur and the other without spur. fLR 1.45, mLR 0.63, hLR 0.77, fTR 0.31, fBR 2.4, mBR 6.4, hBR 5.8. Pulvilli large, brush-like. Dorsal appendage in Fig. 6 f.

11. *Polypedilum (Polypedilum) tamanigrum* Sasa, 1983

(Figs. 6 g, h)

Three males, No.394:18-20, SWP at Wani River on Nov. 28. BL 2.96, 2.84, 2.98 mm, WL 1.56, 1.58, 1.53 mm, WW/WL 0.34, 0.31, 0.32. Scutal stripes and postnotum brown, scutellum, legs and abdominal tergites yellowish brown. ER 0.23, 0.21, 0.26, AR 0.76, 0.80, 0.73, AHR 0.41, 0.46, 0.48, P/H 1.03, 0.98, 0.91. SO 10:10, 11:11, 11:12, CL 13, 17, 14.

Anteprenotum deeply separated, without seta. DM 14, 13, 16, DL 14:14, 17:16, 18:17, PA 5:4, 4:5 5:5, SC 13, 12, 9. Squama with 8:9. 6:7, 7:7 fringe hairs, R2+3 in contact with R1, VR 1.19, 1.26, 1.27, R/Cu 1.20, 1.18, 1.23. fLR 1.82, mLR 0.52, 0.51, 0.55, hLR 0.73, 0.68, fTR 0.28, fBR 3.8, mBR 7.2, 5.2, 5.6, hBR 6.8, 6.7. Dorsal appendage in Fig. 6 g (with 2 basal setae, No.394:19) and Fig. 6 h (with 3 basal setae, No.394:20).

Remarks. The structure and measurement data of the present specimens are almost coincident with those of *P. tamanigrum* Sasa, 1988, recorded first from Tama River, Tokyo, and later from more than 10 localities in the mainland of Japan, excepting that body coloration of the present specimens are generally paler.

12. *Polypedilum (Polypedilum) tsukubaense* (Sasa, 1983) (Figs. 6 i,j)

Three males, No.394:01-03, were collected by sweeping at Wani River on Nov. 28. BL 4.06, 3.82, 4.18 mm, WL 2.10, 2.12, 2.00 mm, WW/WL 0.28, 0.30, 0.31. Body almost entirely pale, partly only slightly yellowish, a quite unusual coloration. ER 0.32, 0.32, 0.34, AR 1.76, 1.49, AHR 0.54, P/H 1.18. SO 13:12, 12:12, 12:12, CL 16, 16, 14. Frontal tubercles absent. Anteprenotum widely separated, without seta. DM 12, 16, 25, DL 16:16, 16:17, 16:16, PA 4:4, 4:4, 4:5, SC 19, 21, 24. Wing bare, without cloudy or dark marks, R2+3 in contact with R1, VR 1.24, 1.20, 1.28, R/Cu all 1.14. Terminal structure of tibiae and tarsi same as in most other species of this genus. fLR 1.19, mLR 0.62, 0.59, hLR 0.79, fTR 0.34, fBR 3.3, mBR 6.7, hBR 6.6. Anal point long, narrow, parallel-sided and apically truncate. Dorsal appendage (Fig. 6 i) is quite unusual in structure, with a long lateral seta arising slightly distal to the middle of distal horn, and two inner setae arising at about middle of the distal horn (inner setae, if present, arise from the base of dorsal appendage in other species). Ventral appendage (Fig. 6 j) is also quite characteristic, with a caudally directed apical seta, and some 15 recurved setae in a distal portion from 1/5 to 2/5 apart from the apex.

Specimens of this species, No.394:95-97, were obtained also by laboratory rearing of fallen leaves collected on Goto this time. Their structure is almost the same as in the above described wild specimens, but the body size and wing length are slightly shorter, presumably due to the difference in nutrition or temperature of larval growth. Their measurement data are: BL 3.68, 3.36, 3.57 mm, WL 1.68, 1.72, 1.80 mm, WW/WL 0.31, 0.30, 0.30, ER 0.37, 0.25, 0.26, AR 1.57, 1.73, 1.71, AHR 0.56, 0.56, 0.55, P/H 0.92, 1.18, 1.17, SO 12:12, 13:13, 13:13, CL 18, 18, 16, PN all 0, DM 18, 18, 16, DL 4:4 5:4 5:6, PA 4:4, 5:4, 5:6, SC 23, 16, 21. SQ 14:14, 14:16, 10:9, R2+3 in contact with R1, VR 1.19, 1.23, 1.22, R/Cu 1.15, 1.13, 1.16. fLR 0.79, 0.86, 0.81, mLR 0.62, 0.61, 0.58, hLR 0.83, 0.79, 0.77, fTR 0.31, 0.30, 0.32, fBR 3.5, 4.2, 3.7, mBR 4.0, 5.3, 5.7, hBR 5.1, 5.6, 5.1.

Remarks. This species was first recorded from a stream on Mount Tsukuba, Ibaraki, and later from more than ten localities in the mainland of Japan, and is quite characteristic especially in body coloration and in the structures of dorsal and ventral appendages of hypopygium. In the present study, details of measurement data of the wild and the laboratory reared specimens obtained in the same locality are presented.

13. *Polypedilum (Polypedilum) cultellatum* Goetghebuer, 1931 (Fig. 6 k)

A male, No.394:74, SWP at Ohgawara River on Nov. 29. BL 3.89 mm, WL 1.92 mm, WW/WL 0.32. Scutel stripes and postnotum dark brown, other scutel areas and scutellum yellow, legs brownish yellow, abdominal tergites yellow, hypopygium brown. ER 0.27, AR 1.63, AHRO.52, P/H 0.87, SO 13:14, CL 20. Anteprenotum widely separated, PN 0:0. DM 19, DL 20:21, PA 5:5, SC 22. Wing bare, bluish, SQ 14:16, R2+3 in contact with R1, VR 1.26, R/Cu 1.15. Fore tarsi lost, mLR 0.55, hLR 0.66, mBR 5.2, hBR 5.5. Anal point long, widest at base and tapering towards rounded apex. Dorsal appendage (Fig. 6 k) composed of a long, broad and rounded basa entirely clothed in microtrichia and bearing 2 inner and 4 apical setae, and a bare distal horn attached preapically on its inner margin. Ventral appendage long, finger-like but distally expanded slightly, with 8 recurved setae and one long, caudally directed apical seta. Gonostylus narrow and long, widest at about basal 1/3, with an apical seta and with two rows of setae along inner margin.

Remarks. From the above described measurement data and structure, this specimen is diagnosed as *P. (U.) cultellatum* Goetghebuer, 1931, which was originally recorded in Europe, and also from more than 15 localities in various localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.41).

14. *Rheotanytarsus kyotoensis* (Tokunaga, 1938)

Four males, No.394:75-78, SWP at Ohgawara River on Nov. 29. BL 3.14-3.44 (3.28 in average of 4) mm, WL 1.64-1.70 (1.67) mm, WW/WL 0.27-0.29 (0.28), AR 0.90-1.10 (0.97), fLR 2.08-2.22 (2.17). The measurement data and structure are coincident with those of *R. kyotoensis* obtained by Sasa (1980) with specimens collected from Tama River (Tokyo). This species was described first by Tokunaga (1938) from Kyoto, and later from several localities in Tokyo and Toyama (Sasa & Kikuchi, 1995, p.47), but this is the first record of this species from an island of southwestern Japan.

15. *Tanytarsus gotodeeus* sp. nov. (Figs. 7 a-j)

Five males, No.394:39, holotype, 394:40-43, paratypes, all SWP at Wani River on Nov. 28. BL 2.02-2.34 (2.16 in average of 5) mm, WL 1.22-1.29 (1.27) mm, WW/WL 0.31-0.32 (0.31). Scutal stripes and postnotum brown, other scutal areas, scutellum, legs and abdominal tergites yellow. Head in Fig. 7 a. ER 1.17-1.45 (1.32) Antenna with only 10 flagellar segments, AR 0.63-0.74 (0.69), AHR 0.41-0.44 (0.42). P/H 0.87-1.10 (1.01). SO 7-10 (8.7), CL 13-16 (14.2). Anteprenotum (Fig. 7 b) widely separated, without seta. Scutum and scutellum in Fig. 7 c. DM 8-15 (12.4), DL all 8:8, PA all 1:1, SC 4-8 (6.0).

Wing (Fig. 7 d) with rather small numbers of macrotrichia mainly on distal half and along posterior margin. Squama bare, RR 0.43-0.71 (0.58), VR 1.28-1.38 (1.34), R/Cu 1.00-1.07 (1.03). Tip of fore tibia (Fig. 7 e) with a long spur, tips of mid and hind tibiae (Figs. 7 f,g) with two comb scales, both with a spur. fLR 1.63-1.90 (1.72), mLR 0.43-0.48 (0.46), very low as a member of Chironominae, hLR 0.51-0.57 (0.54), fTR 0.28-0.31 (0.29), fBR 3.1-8.1 (4.9), mBR 3.8-6.9 (5.6), hBR 4.2-6.6 (4.9). Pulvilli vestigial.

Hypopygium in Fig. 7 h. Anal point (also in Fig. 7 i) short, broad and rounded, with lateral ridges on basal half, without spine clusters but with numerous microtrichia on entire dorsal surface. Dorsal, median and ventral appendages in Fig. 7 j. Dorsal appendage composed of a broad, rounded base bearing 3 or 4 inwards directed setae, and a long, inwards directed distal horn tapering towards pointed apex. Digitus absent. Median appendage short, with inwards directed simple setae. Ventral appendage stout and finger-like, with 20 recurved and 3 caudally directed short setae arising on distal portion. Gonostylus simple, widest at about middle.

Remarks. This species belongs to genus *Tanytarsus*, and to the *kirai* group, since anal point without lateral ridges and spine clusters. Seven species have been recorded from Japan as members of this group (Sasa, 1998, p.54), among which *T. oyabeparvulus* Sasa, Kawai et Ueno, 1988, and *T. okamotoi* Sasa, 1989, have broad and rounded anal point, but both differ from the present species in that anal point bears peculiar spines, and also in the shape of dorsal and median appendages.

16. *Tanytarsus miyakoflavus* Sasa et Hasegawa, 1988

Five males, No.394:04-08, collected at Wani River on Nov. 28. BL 3.42-3.78 (3.61 in average of 5) mm, WL 1.82-2.04 (1.92) mm, WW/WL 0.29-0.30. Scutal stripes and postnotum brown, other scutal areas, scutellum and abdominal tergites almost entirely pale, legs slightly yellowish. ER 0.64-0.75 (0.71), AR 0.99-1.18 (1.09), AHR 0.51-0.56 (0.53), P/H 1.02-1.15 (1.08), SO 6-10 (8.3), CL 12-15 (13.0). Anteprepronotum widely separated, without seta. DM 8-12 (10.0), DL 6-10 (7.7), PA all 1, SC 2 in one, 4 in four males. Wing with macrotrichia rather sparsely on the principal veins and on distal half and along posterior margin. Squama bare, RR 0.39-0.42 (0.41), VR 1.25-1.30 (1.27), R/Cu 1.05-1.10 (1.08). fLR 2.56, mLR 0.59-0.66 (0.63), hLR 0.76-0.77, fTR 0.40, fBR 3.6, mBR 5.4-8.4 (6.6), hBR 4.4-4.9 (4.7). Pulvilli vestigial. Anal point long, widest at base and apically rounded, with lateral ridges and 4-6 spine clusters. Dorsal appendage roughly oval, digitus absent. Median appendage short, with inwards directed setae. Ventral appendage long, finger-like, with some 10 recurved and 3 caudally directed setae. Gonostylus long and narrow, nearly parallel-sided.

Remarks. This species belongs to the *oyamai* group of genus *Tanytarsus*, since anal point with lateral ridges and spine clusters, digitus is absent, and median appendage is short and the setae are directed inwards. The above measurement data and structure fit almost to those of *T. miyakoflavus* Sasa et Hasegawa, 1988, recorded first at Miyako Island, southern Okinawa, and later also from Tokushima and Toyama Prefectures in the mainland of Japan (Sasa & Kikuchi, 1995, p.49).

17. *Brillia japonica* Tokunaga, 1939

A male, No.394:09, SWP at Wani River on Nov. 28. BL 4.26 mm, wing entirely clothed in macrotrichia, WL 2.36 mm, WW/WL 0.25. ER 0.63, AR 0.91, AHR 0.47, P/H 1.18, SO 34:36, CL 30, PN 32:32, DM 0, DL 65:69, PA 24:24, SC 54. SQ 16:16, R2+3 in contact with R1, VR 1.31, R/Cu 1.13. fLR 0.78, mLR 0.49, hLR 0.52, fTR 0.16, fBR 3.4, BR 6.0, hBR

5.3.

This species was recorded first from Kyoto, and later from several localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.52).

18. *Cricotopus bicinctus* (Meigen, 1818)

A male, No.394:93, SWP at Fukue on Nov. 29. This is a species described first in Europe, and has been recorded also from more than 10 localities in the mainland of Japan and also from Amami and Okinawa Islands, southern Japan (Sasa & Kikuchi, 1995, p.54).

19. *Cricotopus bifascius* Tokunaga, 1936

A male, No.394:60, SWP at Wani River on Nov. 28. BL 3.24 mm, WL 1.82 mm, WW/WL 0.30, AR 1.21, fLR 0.62. Abdominal tergites I, IV and V pale, gonostylus expanded in the middle, inner margin strongly convex. This species was recorded by the original author from Kyoto, and later from several localities in the mainland of Japan (Sasa & Kikuchi, 1995, p.54).

20. *Cricotopus polyannulatus* Tokunaga, 1936

Two males, No.394:58, 59, SWP at Wani River on Nov. 28. BL 2.78, 2.98 mm, WL 16.0, 1.72 mm, WW/WL 0.31, 0.32, AR 1.14, 1.15, fLR 0.68, 0.68. Abdominal tergites I, IV and VII pale, other tergites dark brown. Gonostylus with concave inner margin. This species was recorded by the original author from Kyoto, and also from Tokushima and Taiwan.

21. *Paratrichocladius gotoefeus* sp. nov. (Figs. 8 a-i)

A male, No.394:29, SWP at Wani River on Nov. 28. BL 3.02 mm, WL 1.46 mm, WW/WL 0.36. Scutum largely black, only humeral and lateral areas are paler, scutellum, legs and abdominal tergites largely dark brown. Head in Fig. 8 a. Eyes highly pubescent, reniform and without dorsomedial projection, ER 1.20. Antenna with 13 flagellar segments but AR 0.30 (very small), AHR 0.29, without apical seta. P/H 0.96. SO 4+4, 4+4, CL 16. Anteprepronotum (Fig. 8 b) tapering towards middle and united in a point, with 5:5 lateral setae. Scutum and scutellum in Fig. 8 c, DM 8, DL 12:12, all well developed and arising in large pale pits, PA 3:5, SC 10.

Wing membrane bare, smooth and brownish, venation in Fig. 8 d. Squama with 10:10 fringe hairs, anal lobe obtuse, costa extended slightly beyond tip of R4+5, RR 0.35, VR 1.13, R/Cu 1.11. Cu2 nearly straight. Tip of fore tibia (Fig. 8 e) with a long spur, tip of mid tibia (Fig. 8 f) with two short spurs, tip of hind tibia (Fig. 8 g) with a long and a short spur, and a comb composed of 15 free spines. fLR 0.61, mLR 0.46, hLR 0.55, fTR 0.14, fBR 2.3, mBR 2.4, hBR 3.2. Legs with large brush-like pulvilli.

The numbers of setae on abdominal tergites are 32 on I, and about 24 on II to VIII, and those on II to VII are distributed roughly into the anterior and the posterior transverse rows (Fig. 8 h). Hypopygium in Fig. 8 i. Anal point absent, virga conspicuous, composed of 4 codes 30 μ m long. Inner lobe of gonocoxite with rounded margin. Gonostylus simple, widest near apex, without preapical swelling.

Remarks. This specimen belongs to the genus *Paratrachocladus* Santos Abreu, 1918, since general structure is typical as a member of *Orthocladini*, and eyes are pubescent, anal point absent, and dorsomedian setae of scutum are well developed and arising from large pale pits. Among the previously known species of this genus, it is related to *P. yamasiroprimus* Sasa, 1994 (TPES, 1994, p.30) recorded from a hot spring town Yamashiro (Ishikawa), in that legs with large pulvilli (pulvilli are absent in other species of this genus), and inner lobe of gonocoxite with rounded margin, but in this species AR is 1.15-1.26 and much larger (0.30 in the present species), and surparobital setae are composed of 1 inner and 4 laterals (4 inner and 4 laterals in the present one).

22. *Paratrachocladus rufiventris* (Meigen, 1830)

A male, No.394:10, SWP at Wani River on Nov. 28. This is a species described first in Europe, and recorded also from more than 10 localities in the mainland of Japan (Sasa & Kikuchi, 1995, p. 57).

23. *Rheocricotopus (Paracricotopus) irregularis* (Niitsuma, 1990)

(Figs. 9 a-j)

A male, No.394:28, SWP at Wani River on Nov. 28. BL 3.62 mm, WL 1.67 mm, WW/WL 0.33. Scutum with large pale humeral pits, stripes dark brown, scutellum yellow, postnotum dark brown, legs and abdominal tergites brown. Head in Fig. 9 a. Eyes pubescent, reniform, ER 1.19. Antenna with 13 flagellar segments, AR 0.26 (very low), AHR 0.24, apical seta absent. P/H 0.87. SO 7+7, 7+5, the inner 7 setae are all very short. CL 20. Anteprenotum (Fig. 9 b) thickly united, with 10:10 lateral setae. Setae on scutum and scutellum in Fig. 9 c. DM 10, DL 19:19, PA 4:3, SC 12.

Wing (Fig. 9 d) bare, plain, squama with 12:12 fringe hairs, RR 0.33, VR 1.25, R/Cu 1.08. Cu2 nearly straight. Tip of fore tibia (Fig. 9 e) with a long spur, tip of mid tibia (Fig. 9 f) with two short spurs, tip of hind tibia (Fig. 9 g) with a long and a short spur, and a comb composed of 16 free spines. fLR 0.62, mLR 0.47, hLR 0.53, fTR 0.14, fBR 2.3, mBR 2.3, hBR 3.3. Legs with large, brush-like pulvilli (Fig. 9 h).

Setae on abdominal tergites (Fig. 9 i) are 32 on I and II, 24 on III to V, 28 on VI, and 24 on VII and VIII, and those on II to VII are distributed in two transverse rows, a characteristic of this subgenus. Hypopygium in Fig. 9 j. Anal point long and triangular, widest at base and tapering towards sharply pointed apex, with 3 lateral setae on both sides, like in that of subgenus *Orthocladus*. Inner lobe of gonocoxite low and broad, with rounded margin. Gonostylus simple, with concave inner margin, and a small but sharply angulate preapical swelling.

Remarks. This specimen belongs to the genus *Rheocricotopus* Thienemann et Harnisch, 1932, since eyes are pubescent, scutum with a large humeral pits, legs with large pulvilli, and ninth tergite with a large triangular anal point with lateral setae. It further belongs to the subgenus *Paracricotopus* Thienemann et Harnisch, since setae on abdominal tergites II to VII are arranged into the anterior and the posterior transverse rows. Thee above

measurement data and the structure roughly fit to those of *R. (P.) irregularis* (Niitsuma, 1990), recorded with the generic name of *Paracricotopus* from Shizuoka. In the figure of male hypopygium Plate 54 C in the monograph of Japanese Chironomidae (Sasa & Kikuchi, 1995, p.266), that of a different species is quoted by mistake.

24. *Cardiocladius capusinus* (Zetterstedt, 1850) (Figs. 10 a-j)

A male, No.394:21, SWP at Wani River on Nov. 28. BL 4.24 mm, WL 2.08 mm, WW/WL 0.34 (very wide). Scutum largely black, only humeral and lateral areas are pale; scutellum brown and surrounded by black margin; postnotum, legs and abdominal tergites largely black. Head in Fig. 10 a. Eyes bare, reniform, ER 1.08. Antenna with 13 flagellar segments, AR 1.16, AHR 0.58. P/H 1.30. SO 18:18, CL 50 (very many). Anteprepronotum (Fig. 10 b) united, with 14:14 setae along ventral 1/3 of lateral margin. Setae on scutum and scutellum in Fig. 10 c. DM 40, DL 24:24, PA 8:8, SC 40 in multiple rows, all very many but rather short.

Wing (Fig. 10 d) bare, plain and brownish, anal lobe strongly produced inwards. SQ 40:42, RR 0.26, VR 1.09, R/Cu 1.10. Tip of fore tibia (Fig. 10 e) with a long (72 μ m) and basally barbed spur, tip of mid tibia (Fig. 10 f) with two barbed spurs (42, 32 μ m), tip of hind tibia (Fig. 10 g) with a long (59 μ m) and a short (32 μ m) spur, and a comb composed of more than 100 spines thickly covering its distal portion. fLR 0.74, mLR 0.50, hLR 0.57, fTR 0.11, fBR 1.4, mBR 1.8, hBR 2.1. Tarsi I, II and III of mid and hind legs with two terminal spurs, tarsi IV of all legs cordiform and shorter than tarsi V, pulvilli absent (Figs. 10 h, F: fore, M: mid, H: hind tarsi).

Abdominal tergites all with very many setae. Hypopygium in Fig. 10 i. Anal point and virga absent. Ninth tergite with a rounded lobe near the posterior margin bearing 16 short setae, and two groups of long setae in the lateral portion. Inner lobe of gonocoxite (also in Fig. 10 j) long, narrow and rounded. Gonostylus simple, nearly straight, and inner margin slightly swollen preapically.

Remarks. This species was recorded from Japan by Tokunaga (1939) with male, female, pupa and larva collected and reared from rapid streams in Kyoto, and later by Sasa & Okazawa (1992, p.66) by two males collected on a fluorescent lamp in the town of Unazuki (Toyama) at the side of Kurobe River. In the latter specimens, WL 2.28, 2.12 mm, ER 1.18, 1.02, AR 1.52, 1.67 (larger), P/H 1.16, 1.14, data SO 14-16, CL 38-40, PN 12-18, DM 28, 36, DL 28-32, PA 10-12, SC 54, 56, and the present specimen is generally similar to the Kurobe specimens.

25. *Eukiefferiella coerulea* (Kieffer, 1926)

A male, No.394:36, SWP at Wani River on No. 28. BL 2.34 mm, WL 1.24 mm, WW/WL 0.35 (very wide). Scutal stripes and postnotum dark brown, other scutal portions, legs and abdomen brownish yellow. Eyes pubescent, reniform, inner margin slightly convex, ER 1.38. Antenna with only 11 flagellar segments, AR 0.39 (very small), AHR 0.32. P/H 0.87. SO 3:2, CL 6. Anteprepronotum united, with 1:1 lateral seta. DM 8, all minute, DL 12:12, PA 3:4, SC 6. Wing membrane bare, squama bare, R2+3 in contact with R4+5, VR 1.57 (very high), R/Cu

0.92. fLR 0.43, mLR 0.43, hLR 0.45, all very small. Middle and hind tarsi I each with two, middle and hind tarsi II each with one short terminal spur. fTR 0.15, fBR 3.8, mBR 2.4, hBR 2.8. Pulvilli absent.

Abdominal tergites with very small numbers of setae, 16 on I, 12 on II to V, and 10 on VI to VIII. Anal point absent. Inner lobe of gonocoxite tonguelike, with rounded margin. Gonostylus long, slender and straight, without preapical swelling.

Remarks. The above measurement data and structure are almost coincident with those of the specimens recorded by Sasa & Kawai (1987b) from River Itachi (Toyama) and by Sasa (1998) from Lake Akan (Hokkaido) by the name of *E. coerulea* (Kieffer, 1926), which was originally recorded from Europe and was redescribed by Edwards (1929, p.354) and Pinder (1978, p.64).

26. *Eukiefferiella gotogeheus* sp. nov. (Figs. 11 a-i)

A male, No.394:38, SWP at Wani River on Nov. 28. BL 2.64 mm, WL 1.36 mm, WW/WL 0.35. Scutal stripes brown, other scutal areas and scutellum yellow, postnotum dark brown, legs and abdominal tergites yellowish brown. Head in Fig. 11 a. Eyes bare, reniform, ER 1.42. Antenna with 13 flagellar segments, AR 0.58, AHR 0.42. Palp short, P/H 0.79. SO 4:4, CL 7. Anteprenotum (Fig. 11 b) united with a point, with 1:1 lateral seta. Scutum and scutellum in Fig. 11 c; DM 0, DL 8:8, PA 3:3, SC 5.

Wing (Fig. 11 d) bare, without dark marks, squama with 5:5 fringe hairs, R2+3 in contact with R4+5 at the tip. VR 1.40 (very high), tip of R4+5 proximal to tip of Cul, R/Cu 0.96. Tip of fore tibia (Fig. 11 e) with a long spur, tip of mid tibia (Fig. 11 f) with two short spurs, tip of hind tibia (Fig. 11 g) with a long and a short spur, and a comb composed of 11 free spines. fLR 0.75, mLR 0.52, hLR 0.58, fTR 0.17, fBR 4.1, mBR 3.8, hBR 5.8. Pulvilli absent.

Setae on abdominal tergites (Fig. 11 h) are 28 on I, 30 on II to IV, and 14 on V to VIII, and those on III to VII are distributed roughly on two transverse rows. Hypopygium in Fig. 11 i. Anal point very narrow and long, widest at base and tapering towards pointed apex, without microtrichia and setae. Virga small, composed of 4 codes situated on a cup, 20 μ m long. Inner lobe of gonocoxite prominent, nearly rectangular. Gonostylus long and narrow, without preapical swelling.

Remarks. This specimen seems to belong to *Eukiefferiella* Thienemann, 1926, in wider sense, since eyes without dorsomedial projection, wing membrane bare and smooth, squama fringed, Cu2 is straight, pulvilli absent, and anal point is bare and without lateral setae. It further belongs to the *tamaflava* group of this genus, as R2+3 is in contact with R4+5, tip of R4+5 is proximal to tip of Cul, squama fringed, eyes bare, and anal point is present. It is most closely related to *E. tamaflava* Sasa, 1981, among this group, in body coloration, in the numbers of setae on head and thorax, structure of ninth tergite, but in *E. tamaflava* anal point is essentially different, small and triangular and with a pair of lateral setae, AR is 0.37-0.38 and smaller, and fLR is larger. 0.86-0.89.

27. *Eukiefferiella tamaparvula* (Sasa, 1981) (Figs. 12 a-i)

A male, No.394:35, SWP at Wani River on Nov. 28. BL 2.84 mm, WL 1.50 mm, WW/WL 0.30. Scutal stripes and postnotum dark brown, other scutal areas, scutellum, legs and abdomen yellow. Head in Fig. 12 a. Eyes bare, reniform, ER 1.40. Antenna with 13 flagellar segments, AR 0.80, AHR 0.49. P/H 0.87. SO 1+3:1+3, CL 6. Anteprenotum (Fig. 12 b) tapering towards middle and united with a point, with 1:1 lateral seta. DM 0, DL 8:8, PA 3:3, SC 6 (Fig. 12 c).

Wing bare, squama with 15 fringe hairs, venation in Fig. 12 d. R2+3 separated, RR 0.42. VR 1.19, R/Cu 1.01. Cu2 nearly straight. Tip of fore tibia (Fig. 12 e) with a long spur, tip of mid tibia (Fig. 12 f) with two short spurs, tip of hind tibia (Fig. 12 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.64, mLR 0.51, hLR 0.55, fTR 0.16, fBR 4.0, mBR 2.8, hBR 3.1. Pulvilli absent.

Abdominal tergites with relatively small numbers of setae, 24 on I, 32 on II to III, and 24 on VIII. Hypopygium in Fig. 12 h. Anal point (also in Fig. 12 i) triangular, widest at base and tapering towards pointed apex, with 5 lateral setae on both sides. Virga absent. Inner lobe of gonocoxite double layered, the dorsal lobe finger-like, longer than wide and with 7 short setae, the ventral lobe low and broad. Gonostylus short, parallel-sided and without preapical swelling.

Remarks. The above measurement data and structure of this specimen are almost coincident with those of *E. tamaparvula* (Sasa, 1981), reared in the laboratory from bottom sediments collected in an upstream site of Tama River, Tokyo, by the name of *Synorthocladus tamaparvulus*, and this is the second record as this species.

28. *Eukiefferiella tokaralemea* Sasa et Suzuki, 1995 (Figs. 13 a-i)

Three males, No.394:32-34, all SWP at Wani River on Nov. 28. BL 2.44, 2.50, 2.74 mm, WL 1.28, 1.48, 1.36 mm, WW/WL 0.31, 0.32, 0.32. Scutal stripes and postnotum dark brown, other scutal areas and scutellum yellow, legs and abdominal tergites brownish yellow. Head in Fig. 13 a. Eyes bare, oval and inner margin convex, ER 1.21, 1.21, 1.07. Antenna with 13 flagellar segments, AR 0.95, 0.92, 0.98, AHR 0.47, 0.46 0.46, without terminal seta. P/H 0.87, 0.98, 0.86. SO 0 inner and 2 or 3 laterals. Anteprenotum connected with a point, without seta excepting in No.394:32 with one lateral seta on left side (Fig. 13 b). DM 0, DL 6:6, 7:7, 8:8, PA all 3, SC all 6 (Fig. 13 c).

Wing (Fig. 13 d) membrane bare, plain, squama with 4:4, 5:7, 4:4 fringe hairs, anal lobe obtuse. Tip of R4+5 is much proximal to tip of Cul, R/Cu 0.88, 0.91, 0.87, and costa extending beyond tip of R4+5 but ending also much proximal to tip of wing. R2+3 in contact with R4+5, VR 1.32, 1.19, 1.33. Cu2 nearly straight. Tip of fore tibia (Fig. 13 e) with a long spur, tip of mid tibia (Fig. 13 f) with two short spurs, Tip of hind tibia (Fig. 13 g) with a long and a short spur, and a comb composed of 14 free spines. fLR 0.77, 0.76, 0.77, mLR 0.44, 0.46, 0.45, hLR 0.52, 0.57, 0.54. fTR all 0.17, fBR 2.1, 2.2, 2.1, mBR all 2.7, hBR 3.5, 5.3, 3.4. Pulvilli absent.

Abdominal tergites (Fig. 13 h) with relatively small numbers of setae, 22 on I, 16 on

II to VII, and 14 on VIII in the holotype. Hypopygium in Fig. 13 i (ventral view). Anal point absent, ninth tergite with rounded posterior margin and without long setae in the middle portion. Inner lobe of gonocoxite prominent, longer than wide and with rounded inner margin, almost entirely clothed in microtrichia and with short setae. Gonostylus long, slender and almost straight, without preapical swelling.

Remarks. This species is considered as belonging to genus *Eukiefferiella* Thienemann, 1926 in wider sense, since the basic structure is that of tribe Orthoclaadini, and eyes without dorsomedial extension, wing bare, Cu2 straight, pulvilli absent, and abdominal tergites with small numbers of setae. It further belongs to the *yasunoi* group defined by Sasa & Kikuchi (1995, p.157), since R2+3 is in contact with R4+5, squama fringed, eyes bare, and anal point is absent. It further belongs to the group without dorsomedian setae on scutum, and the measurement data and structure are almost coincident with those described from the Tokara Islands by the name of *E. tokaralemea* by Sasa & Suzuki (1995), as shown in the key compiled by Sasa (1998, p.75).

29. *Orthocladus glabripennis* (Goetghebuer, 1921) (Figs. 14 a-k)

Two males, No.394:22, No.394:30, both collected by sweeping at Wani River on Nov. 28. BL 3.97, 3.78 mm, WL 2.48, 2.24 mm, WW/WL 0.29, 0.29. Scutum and postnotum black, scutellum, legs and abdominal tergites dark brown. Head in Fig. 14 a. Eyes bare, both with a short wedge-shaped dorsomedial projection, ER 0.84, 0.87. Antenna with 13 flagellar segments, AR 1.74, 1.96, AHR 0.63, 0.55. P/H 1.00, 0.77. SO 16:16, 14:14, CL 14, 9. Anteprepronotum (Fig. 14 b) united, with 8:8, 4:4 lateral setae. Setae on scutum and scutellum in Fig. 14 c. DM 10, 10, all minute, DL 8:8, 7:8, all well developed, PA 4:4, 4:4, SC 10, 10, in a single transverse row.

Wing in Fig. 14 d. Squama with 25:28, 21:20 fringe hairs. Anal lobe strongly produced inwards. R2+3 separated, RR 0.33, 0.45. VR 1.10, 1.12, R/Cu 1.06, 1.03. Tip of fore tibia (Fig. 14 e) with a long spur, tip of mid tibia (Fig. 14 f) with two short spurs, tip of hind tibia (Fig. 14 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.83, 0.80, mLR 0.57, 0.57, hLR 0.61, 0.58. fTR 0.11, 0.12, fBR 2.7, 2.4, mBR 3.9, 2.5, hBR 3.6, 3.5. Tips of middle tarsi I and III, and hind tarsus I with two short spurs, other tarsal segments without terminal spur. Pulvilli absent.

Abdominal tergites with relatively large numbers of setae, 92 on I, 96 on II and III, 76 on IV, 68 on V, 60 on VI, 58 on VII, and 48 on VIII. Hypopygium in Fig. 14 h. Anal point (also in Fig. 14 i) widest at base and tapering towards sharply pointed apex, with 6 lateral setae on both sides and with microtrichia on the basal portion. Virga (Fig. 14 j) large, 54 μ m long, composed of 6 codes situated on a cup, and with short, brush-like barbs on the apical portion, a peculiar structure. Inner lobe of gonocoxite (also in Fig. 14 i, left side) composed of double layers, dorsal lobe narrow and finger-like, with short setae. Gonostylus (Fig. 14 k) widest at about basal 1/3 and inner margin strongly concave.

Remarks. These specimens are structurally typical as a member of subgenus *Orthocladus*, especially in the shape of anal point, in wing venation and in that scutellar setae

are small in the numbers and arranged in a single transverse row, and is peculiar in that eyes with a short, wedge-shaped dorsomedial extension, with a virga, and inner lobes of gonocoxite are double, and gonostylus with strongly concave inner margin. They are considered as belonging to the *glabripennis* complex of subgenus *Orthocladius*, which has a world-wide distribution, and has also been recorded from more than 10 localities in Japan. These specimens show differences in measurement data and structure from the above specimens, but these are considered provisionally as a local variation within this species.

30. *Psectrocladius gotoheius* sp. nov. (Figs. 15 a-j)

A male, No.394:31, SWP at Wani River on Nov. 28. BL 2.90 mm, WL 1.59 mm, WW/WL 0.34. Scutal stripes and postnotum dark brown, other scutal areas and scutellum yellow, legs almost entirely brownish yellow, abdominal tergites and hypopygium almost uniformly brown. Head in Fig. 15 a. Eyes bare, reniform and without dorsomedial projection, ER 1.33 (very high). Antenna with 13 flagellar segments, AR 1.13, AHR 0.56. P/H 1.03. SO 5:5, CL 7. Anteprepronotum (Fig. 15 b) united, with 2:2 lateral setae. DM 0, DL 9:9, PA 3:3, SC only 4 (Fig. 15 c). Wing in Fig. 15 d. Squama with 18:22 fringe hairs, anal lobe slightly produced inwards, RR 0.36, VR 1.20, R/Cu 1.07. Cu2 nearly straight. Tip of fore tibia (Fig. 15 e) with a long (50 μ m) spur, tip of mid tibia (Fig. 15 f) with only one spur (43 μ m) long, (characteristic to this subgenus), tip of hind tibia (Fig. 15 g) also with only one spur (52 μ m) long, and a comb composed of 14 free spines. Tips of tarsi I, II and III of mid legs with two terminal spurs, tips of tarsi I, II and III of hind legs each with one terminal spur, also unusual characters of this species. All legs with large brush-like pulvilli (Fig. 15 h, fore tarsus V).

Setae on abdominal tergites are 60 on I, 68 on II and III, 64 on IV to VI, 48 on VII, and 44 on VIII. Hypopygium in Fig. 15 i. Anal point (also in Fig. 15 j) widest at base and apically rounded, entirely clothed in microtrichia, and with 3 or 4 lateral setae. Inner lobe of gonocoxite (Fig. 15 j) very low and long, with rounded posterior margin, a characteristic of this species. Gonostylus (also in Fig. 15 k) nearly parallel-sided, inner margin almost straight.

Remarks. This specimen belongs to subgenus *Psectrocladius*, since most of the basic structure are the *Orthocladius* type, but legs with large pulvilli, and mid tibia with only one terminal spur. It is especially characteristic among members of this group in that eyes are reniform and without dorsomedial projection, DM setae are absent, SC only 4, anal point is apically rounded, entirely clothed in microtrichia, and with lateral setae, inner lobe of gonocoxite is very long and low, and gonostylus is parallel-sided and nearly straight. It has no subterminal spines on front tibia, and thus resembles to *P. aquatronus* Sasa, 1979, and to *P. yunoquartus* Sasa, 1984, but in these species WL is 2.3-2.9 mm and much longer, AR 1.7-2.1 and also larger, and inner lobe of gonocoxite is rectangular, and anal point is smaller, free from microtrichia and lateral setae (entirely clothed in microtrichia, and with 3 or 4 lateral setae in the present species).

31. *Setukoyusurika gotoijeus* gen. et sp. nov. (Figs. 16 a-k)

Two males, No.394:91, paratype, No.394:92, holotype, both SWP at Fukue on Nov. 29. BL 3.98, 3.74 mm, WL 2.32, 2.26 mm, WW/WL 0.28, 0.29. Scutal stripes and postnotum black, scutellum and legs brown, abdominal tergites dark brown. Head in Fig. 16 a. Eyes bare, each with a wedge-shaped dorsomedial extension, ER 0.49, 0.85. Antenna with 13 flagellar segments, AR 1.81, 2.02, AHR 0.56, 0.63. P/H 1.22, 1.10. SO 2+6:2+6, 3+5:3+5, CL 16, 16. Anteprenotum (Fig. 16 b) united, with 6:4, 4:4 lateral setae. DM both 0, DL 8:8, 9:9, PA 5:5, 5:5, SC 10, 8 (Fig. 16 c).

Wing in Fig. 16 d. Membrane finely granular, bluish, squama with 10:17, 10:15 fringe hairs, anal lobe slightly expanded inwards, costa not extended beyond tip of R4+5, RR 0.47, 0.45, VR 1.06, 1.09, R/Cu 1.12, 1.12. Cu2 nearly straight. Tip of fore tibia (Fig. 16 e) with a long spur (85 μ m), tip of mid tibia (Fig. 16 f) with two short spurs (28, 34 μ m), tip of hind tibia (Fig. 16 g) with a long (66 μ m) and a short (26 μ m) spur, and a comb composed of 10 free spines in the holotype. fLR 0.75, 0.77, mLR 0.50, 0.52, hLR 0.54, 0.58, fTR 0.13, 0.13, fBR 2.3, 2.3, mBR 2.3, 2.5, hBR 3.3, 3.9. Tips of tarsi I of mid and hind legs with two terminal spurs, but other tarsal segments without terminal spur, also an unusual character. Pulvilli very small, brush-like.

Abdominal tergites with relatively large numbers of setae, 60 on I, 78 on II and III, 76 on IV, 72 on V, 58 on VI, and 38 on VII and VIII. Hypopygium in Fig. 16 h. Anal point absent, but ninth tergite with a rectangular lobe bearing numerous short setae (also in Fig. 16 i). Virga (Fig. 16 j) long, composed 6 fine codes. Inner lobe of gonocoxite (also in Fig. 16 k) double, both low and long, the dorsal one with rounded posterior margin, and the ventral one with obtusely angular posterior margin. Gonostylus (also in Fig. 16 k) simple, inner margin slightly concave, with strong megaseta.

Remarks. This species belongs to the *Orthocladius* complex of the subfamily Orthoclaadiinae, since eyes are bare and with a long dorsomedial projection, abdominal tergites with many setae distributed almost evenly, R2+3 separated and costa is not extended beyond tip of R4+5, which is situated distal to tip of Cul, and Cu2 is long and nearly straight. However, it is quite unusual as a member of this complex in that wing membrane is bluish and finely granular, anal point is absent but ninth tergite with a broad and rounded lobe bearing many setae, gonocoxite with two long and rounded inner lobes, and gonostylus with strongly concave inner margin. Since the authors cannot find in the previous papers a genus with such characters, a new genus is created in order to accept this new species. The generic name is dedicated to Mrs. Setsuko Suzuki, who has greatly contributed to our researches by preparing many excellent slide mounted specimens used in our studies.

32. *Limnophyes minimus* (Meigen, 1818)

Four males, No.394:37, SWP at Wani River on Nov. 28, No.394:85-87, SWP at Ohgawara River on Nov. 29. This is a species of world-wide distribution, and has been collected also from more than 10 localities in Japan (Sasa & Kikuchi, 1995, p.67).

33. *Trissocladius itachigranulatus* Sasa et Kawai, 1987

Five males, No.394:23-27, SWP at Wani River on Nov. 28. BL 3.64-4.04 (3.83 in average of 5) mm, WL 1.98-2.12 (2.04) mm, WW/WL 0.27-0.29 (0.28). Eyes bare, each with a wedge-shaped dorsomedial projection, ER 0.88. Antenna with 13 flagellar segments, AR 1.29-1.53 (1.43), AHR 0.53-0.65 (0.59). P/H 0.94-1.00 (0.97). SO 10-15 (11.3), CL 8-11 (9.2). Anteprenotum united, with 3-6 (4.0) lateal setae. DM 12-16 (14.8), all minute, DL 14-19 (17.0), PA 6-8 (6.8), SC 8-11 (9.2). Wing bare, without dark marks, squama with 6-16 (10.6) fringe hairs, RR 0.34-0.43 (0.38), VR 1.08-1.15 (1.13), R/Cu 10.4-1.07 (1.06). fLR 0.66-0.77 (0.63), mLR 0.49-0.53 (0.51), hLR 0.59-0.64 (0.61), fTR 0.13-0.16 (0.14), fBR 2.7-3.2 (3.0), mBR 2.5-4.4 (3.5), hBR 3.0-5.4 (4.2). Pulvilli absent. The structure of hypopygium and other body portions as described and illustrated in the original paper by Sasa & Kawai (1987, p.64, 65).

Remarks. This species was recorded only once by the original authors from at the side of a small stream in Toyama, and this is the second record. The structure of wing, hypopygium, especially that of anal point, inner lobe of gonocoxite, and gonostylus are quite characteristic.

34. *Thienemanniella nipponica* (Tokunaga, 1936) (Figs. 17 a-i)

A male, No.394:44, SWP at Wani River on Nov. 28. BL 1.76 mm, WL 0.93 mm, WW/WL 0.42. Scutal stripes, marginal areas of scutellum, and postnotum black, other scutal areas and legs yellow, abdominal tergites brown. Head in Fig. 17 a. Eyes bare, reniform, ER 1.33. Antenna with 12 flagellar segments, AR 0.31, AHR 0.30. P/H 0.88. SO 1+2:1+2, CL 11. Anteprenotum (Fig. 17 b) united with a point, with 4:3 lateral setae. DM 0, DL 9:9, PA 2:2, SC 4 (Fig. 17 c). Wing bare, without dark marks, Squama bare, venation (Fig. 17 d) typical as a member of Corynoneurini, veins R all short and fused with the thickened costa. Fore legs both lost, tip of mid tibia (Fig. 17 e) with two short spurs, tip of hind tibia (Fig. 17 f) not expanded and with a long and a short spur, both barbed, and a comb composed of 11 free spines. mLR 0.56, hLR 0.66, mBR 2.4, hBR 2.3. Tarsi IV cordiform and shorter than tarsi V (Fig. 17 f, mid tarsi III, IV and V), pulvilli absent (Fig. 17 g).

The numbers of setae on abdominal tergites are 9 on I, 5 on II, 4 on III to V, 5 on VI, 7 on VII, and 6 on VIII (Fig. 17 h). Hypopygium in Fig. 17 i. Anal point absent. Ninth tergite with two transverse rows of each 10 short setae. Inner lobe of gonocoxite low, broad and rounded. Gonostylus short and simple, without preapical swelling.

Remarks. This species has a wing venation typical as a member of tribe Corynoneurini, and belongs to the genus *Thienemanniella* Kieffer, 1911, since tip of hind tibia is not expanded. According to the key prepared to species of this genus by Pinder (1978), it is closest to *T. clavicornis* (Kieffer) in that AR is very small and last antennal segment is only as long as the preceding 3 segments combined, and gonocoxite lobe is gently curved, but in *T. clavicornis* the lobe is extended almost to end of gonocoxite, while in the present specimen it ends at about middle in gonocoxite. According to the key to the Japanese species of this genus prepared by Sasa and Kikuchi (1995, p.202), it comes out to *T. nipponica* (Tokunaga,

1936, in *Tenthredo/Acta Entomologica*, vol. 1, p.9), since eyes are bare, AR is 0.23-0.35, and inner lobe of gonocoxite is small, low and broad in the original description, and the above structure and measurement data roughly fit to it. This species was described with males collected along a stream in Kyoto. In the monograph of Chironomidae edited by Wiedelholm (1989), Cranston *et al.* (p.245) state "eyes pubescent to hairy" for this genus, and also in the key compiled by Pinder (1978), the character whether eyes are bare or pubescent is not used for differentiation of species of this genus. Therefore, the presence of two species of this genus in Japan with bare eyes seems to be also quite characteristic.

35. *Thienemanniella gotopallida* sp. nov. (Figs. 18 a-i)

Three males, No.394:61-63, SWP at Wani River on Nov. 28. BL 1.88, 1.66, 1.76 mm, WL 1.16, 1.04, 1.10 mm, WW/WL 0.38, 0.38, 0.36. Ground color of scutum yellow, scutal stripes, scutellum and postnotum brown, legs yellow, abdominal tergites III largely yellow and brown for anterior margin, II and III entirely yellow, IV and V largely brown, VI and VII brown for anterior and lateral portions and yellow in the median and posterior zone, VIII and hypopygium largely brown. Head in Fig. 18 a. Eyes pubescent, ER 1.33, 1.58, 1.48. Antenna also with 12 flagellar segments, AR 0.66, 0.60, 0.62, AHR 0.40, 0.31, 0.42, last segment as long as 6 or 7 preceding segments combined. P/H 0.80, 0.84, 0.74. Setae on scutum and scutellum in Fig. 18 C. SO all 0, CL 10, 12, 10. Antepronotum united, with 1:2, 2:3, 2:2 lateral setae. DM all 0, DL 10:10, 10:10, 8:8, PA all 3, SC 2, 2, 3. Wing bare, venation typical as a member of *Corynoneurini*. Tip of fore tibia (Fig. 18 e) with a long (35 μ m) all basally barbed spur, tip of mid tibia (Fig. 18 f) with two short spurs (12, 14 μ m), tip of hind tibia (Fig. 18 g) not expanded, and with one long (41 μ m) and two short spurs, and a comb composed of 14 free spines. fLR 0.73, 0.70, 0.69, mLR 0.65, 0.65, 0.67, hLR 0.69, 0.68, 0.66, fTR 0.13, 0.12, 0.13, fBR 2.7, 2.5, 2.6, mBR 2.9, 2.8, hBR 3.8, 3.2. The numbers of setae on abdominal tergites (Fig. 18 h) are 5 on I, 3 on III, 5 on III to V, 4 on VI, and 3 on VIII. Hypopygium (Fig. 18 i) without anal point, ninth tergite without long setae, inner lobe of gonocoxite broad and caudal margin nearly rectangular, gonostylus simple and without preapical swelling.

Remarks. The above measurement data and structure are almost coincident with those of the species described by the name *T. vittata* (Edwards, 1924) with two males collected from Jinzu River (Toyama) by Sasa (1990, TPES, P.49), excepting that the value of AR is slightly larger (0.50, 0.51, in Jinzu males). However, the body coloration is remarkably paler in the present specimens (in the Jinzu males, ground color of scutum brown, stripes, scutellum and postnotum black, legs dark brown, abdominal tergites largely dark brown, excepting the distal half of middle portions of IV and VII as well as anterior margin of VII yellow in the same pattern as in the present specimens). Therefore, the present specimens are recorded as a new subspecies of *T. vittata* with paler body coloration and slightly higher antennal ratio.

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REFERENCES

Special references to each species are described in the remarks whenever necessary. References to identification of Japanese chironomid species were listed in the following two monographs.

- 1) Sasa, M. and Kikuchi, M. (1995): Chironomidae of Japan. 333 pp. Univ. Tokyo Press.
- 2) Sasa, M. (1998): Chironomidae of Japan, 1998. 156 pp. Res. Rep. Kankyo Fukushi Kenkyusho
The following papers were published by us after the above monographs.
- 3) Kobayashi, T. & Suzuki, H. (1999a): *Harnischia omuraensis* sp. nov. and the first record of *Parachironomus monochromus* (van der Wulp) from Japan. Med. Entom. Zool. 50 (2): 79-84
- 4) Kobayashi, T. & Suzuki, H. (1999b): The first record of genus *Apometriocnemus* Saether, 1985, from the Palaearctic Region. Tijdschrift voor Entomologie, 142:65-67
- 5) Sasa, M. (1997): Studies on the chironomid species collected throughout the year in the Shofuku Garden, near the mouth of Kurobe River, Toyama. TPES 1996, pp. 15-69
- 6) Sasa, M. & Ogata, K. (1999): Taxonomic studies on the chironomid midges collected from the Kurobe Municipal Sewage Treatment Plant. Med. Entom. Zool. 50 (2): 85-104
- 7) Sasa, M. & Sumita, M. (1997): The chironomid species collected on the shore of Lake Kibagata by light trap. TPES 1997, pp. 70-74
- 8) Sasa, M. & Suzuki, H. (1995): The chironomid species collected on the Tokara Islands, Kagoshima. Jpn. J. San. Zool. 46 (3):255-288
- 9) Sasa, M. & Suzuki, H. (1997a): Studies on the Chironomidae collected from the Ogasawara Islands, southern Japan. Eido (Med. Ent. Zool.) 48:315-343
- 10) Sasa, M. & Suzuki, H. (1997b): Studies on the chironomid species collected in Kyushu. TPES 1997, pp. 75-105
- 11) Sasa, M. & Suzuki, H. (1998): Studies on the chironomid midges collected in Hokkaido and northern Honshu. Trop. Med. 40 (1):9-43
- 12) Sasa, M., Suzuki, H. & Sakai, T. (1998a): Studies on the chironomid midges collected on the shore of Shimanto River in April 1998. Part 1. Description of the species of the subfamily Chironominae. Trop. Med. 40 (2): 47-89
- 13) Sasa, M., Suzuki, H. & Sakai, T. (1998b): Studies on the chironomid midges collected on the shore of Shimanto River in April 1998. Part 2. Description of additional species belonging to Orthocladinae, Diamesinae and Tanypodinae. Trop. Med. 40 (3): 99-147.
- 14) Sasa, M. & Tanaka, N. (1998): Notes on the chironomid species collected in Gunma Prefecture in 1996-1997. Annual Rep. Gunma Prefect. Inst. Med. & Environ. Sci., 1998, pp. 37-46
- 15) Sasa, M. & Tanaka, N. (1999): Study on the new species of chironomids collected with light traps at the side of Ino River, Gunma Prefecture. Annual Rep. Gunma Pref. Inst. Publ. Health & Envir. Sci. No.31, 38-40
- 16) Sasa, M. & Suzuki, H. (1999a): Studies on the chironomid midges of Tsushima and Iki Islands, Western Japan. Part 1. Species of Chironominae collected on Tsushima. Trop. Med. 41 (1): 1-53

- 17) Sasa, M. & Suzuki, H. (1999a): Studies on the chironomid midges of Tsushima and Iki Islands, western Japan. Part 2. Species of Orthoclaadiinae and Tanypodidae collected on Tsushima. *Trop. Med.* 41 (2):75-132
- 18) Sasa, M. & Suzuki, H. (1999b): Studies on the chironomid midges of Tsushima and Iki Islands, western Japan. Part 3. The chironomid species collected on Iki Island. *Trop. Med.* 41 (3):143-179
- 19) Sasa, M. & Suzuki, H. (2000a): Studies on the chironomid species collected on Ishigaki and Iriomote Islands, southern Japan. *Trop. Med.* 42 (1):1-37
- 20) Sasa, M. & Suzuki, H. (2000b): Studies on the chironomid midges collected on Yaku Island, southwestern Japan. *Trop. Med.* 42 (2):53-134

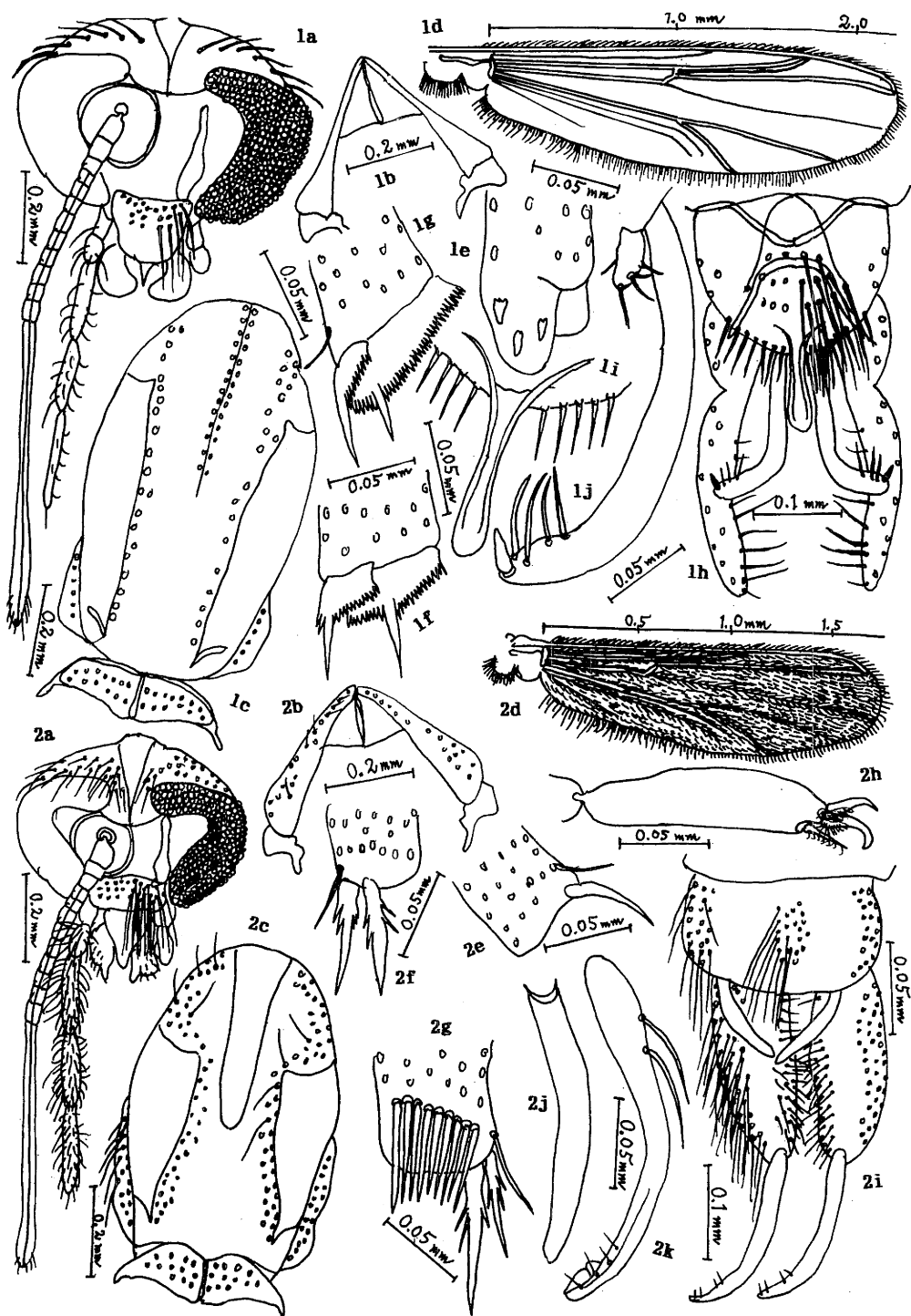


Fig.1 *Stenochironomus gotoabeus* sp. nov.

Fig.2 *Pseudobrillia gotobeeceae* sp. nov.

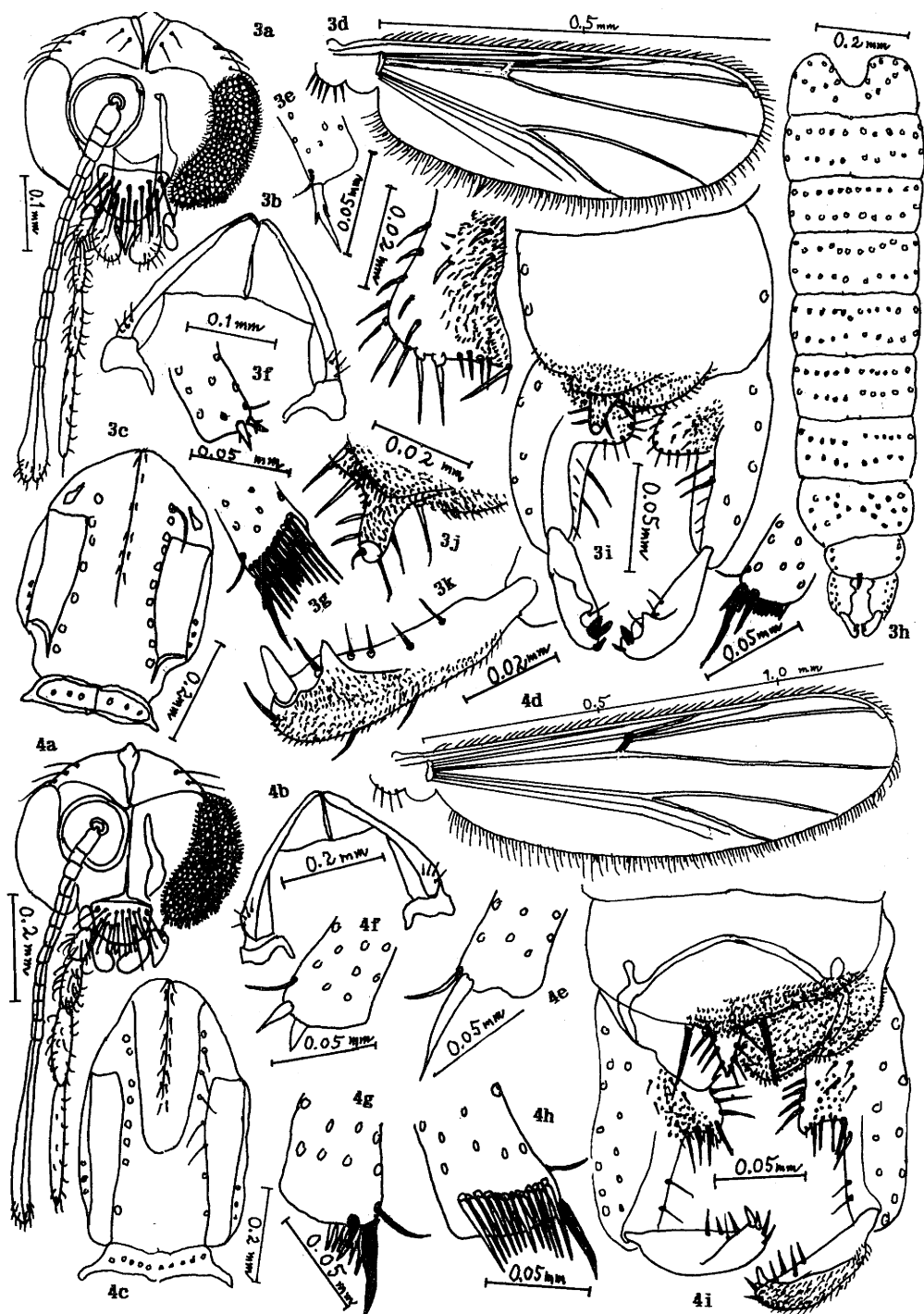


Fig.3 *Rheocricotopus tamabrevis* Sasa, 1983
 Fig.4 *Rheocricotopus gotocedeus* sp. nov.

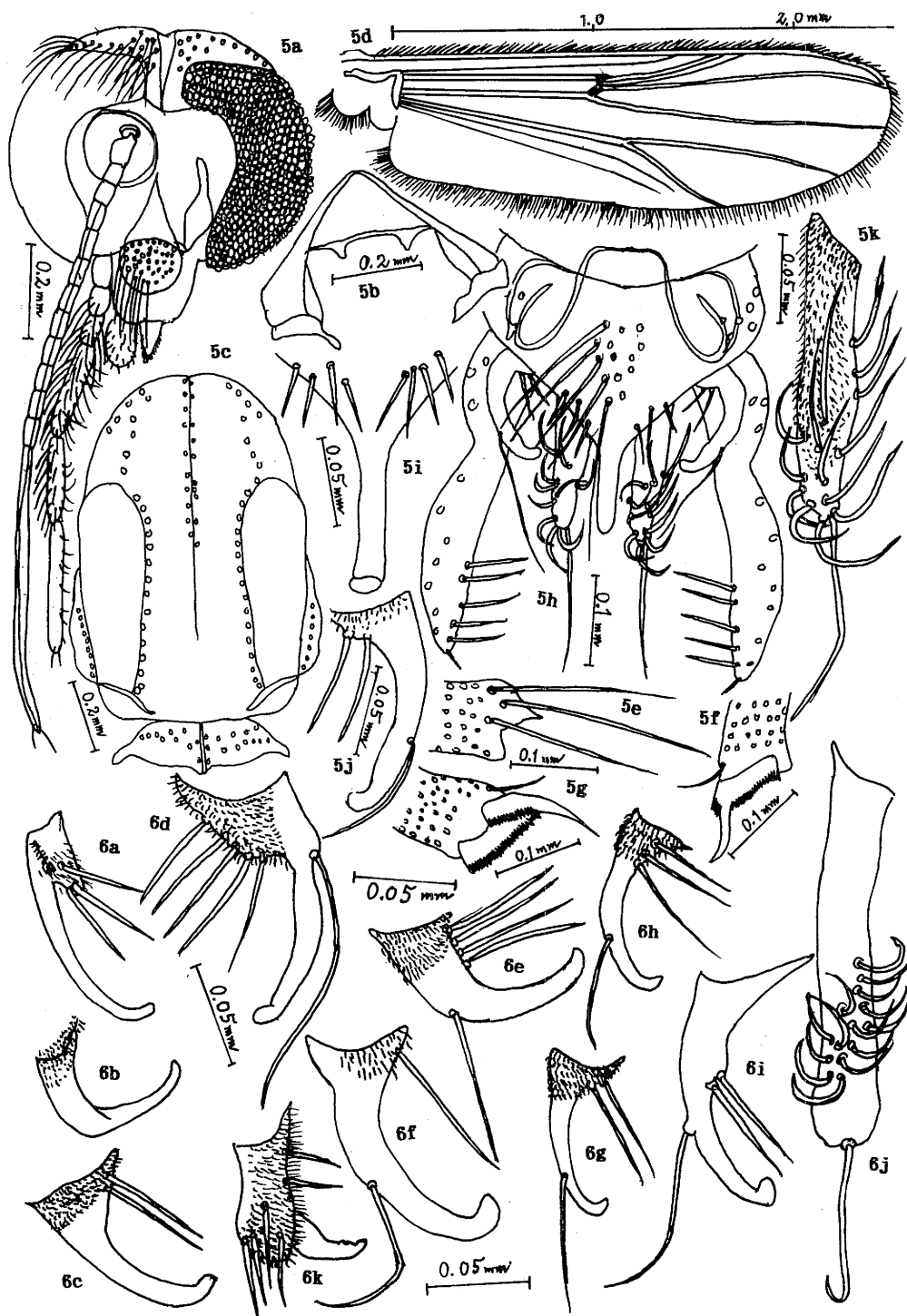


Fig.5. *Polypedilum tamaharaki* Sasa, 1983

Fig.6. Dorsal appendages of *Pentapedilum* and *Polypedilum* spp. (see text)

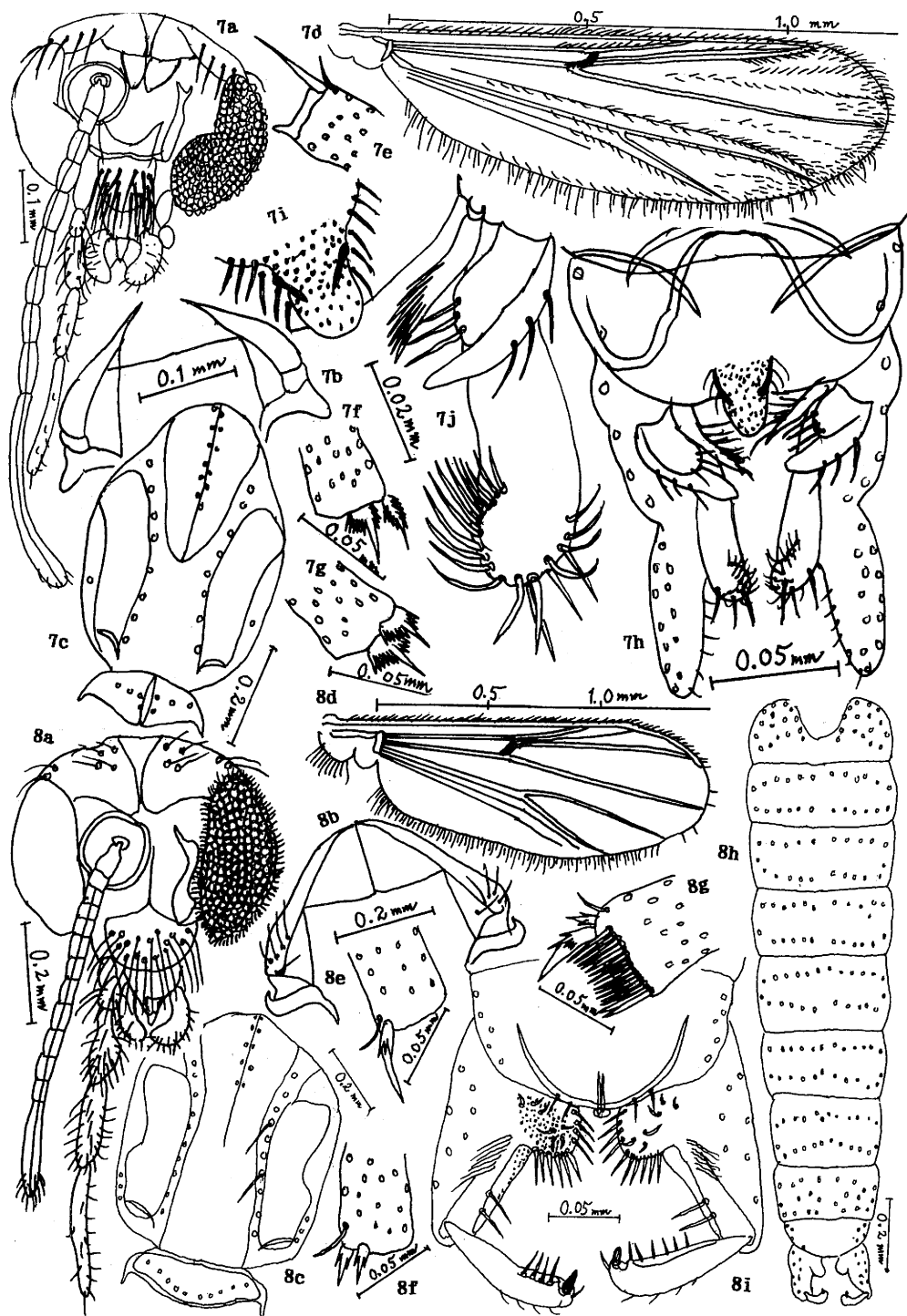


Fig. 7 *Tanytarsus gotodeeus* sp. nov.

Fig. 8 *Paratrachocladus gotoeus* sp. nov.

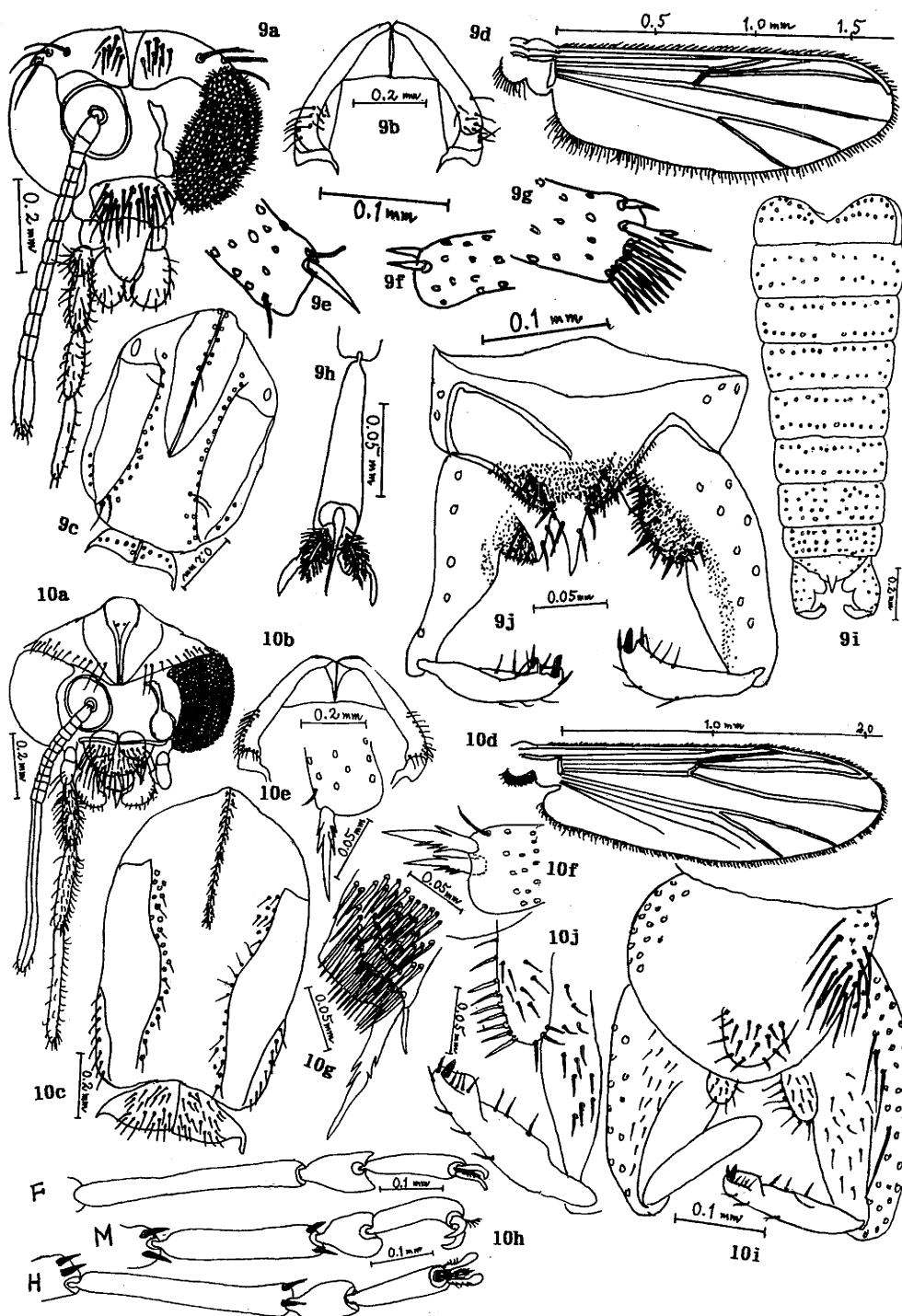


Fig. 9 *Rheocricotopus irregularis* (Niitsuma, 1990)

Fig. 10 *Cardiocladius capusinus* (Zetterstedt, 1850)

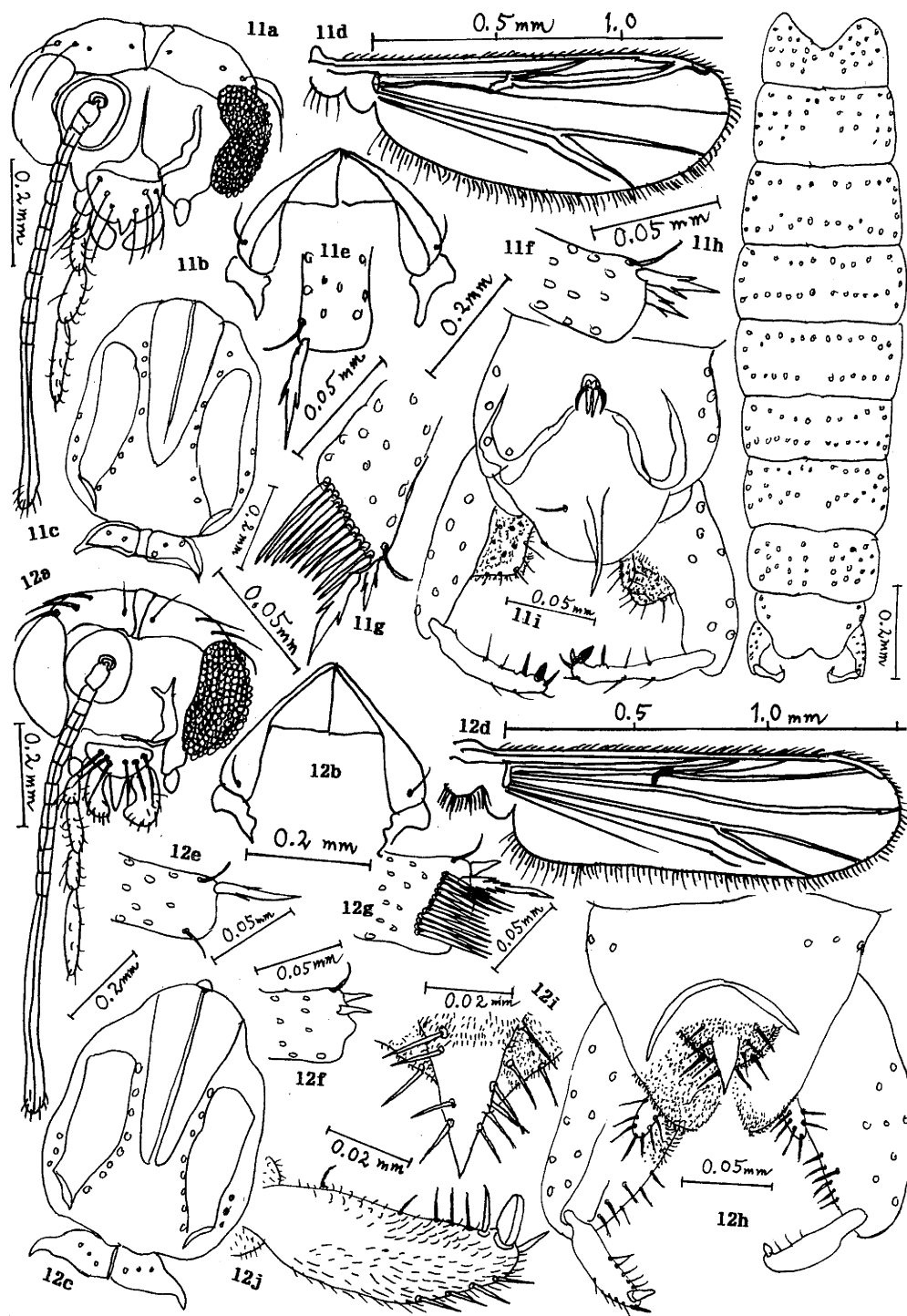


Fig.11 *Eukiefferiella gotogeheus* sp. nov.

Fig.12 *Eukiefferiella tamapurvula* (Sasa, 1981)

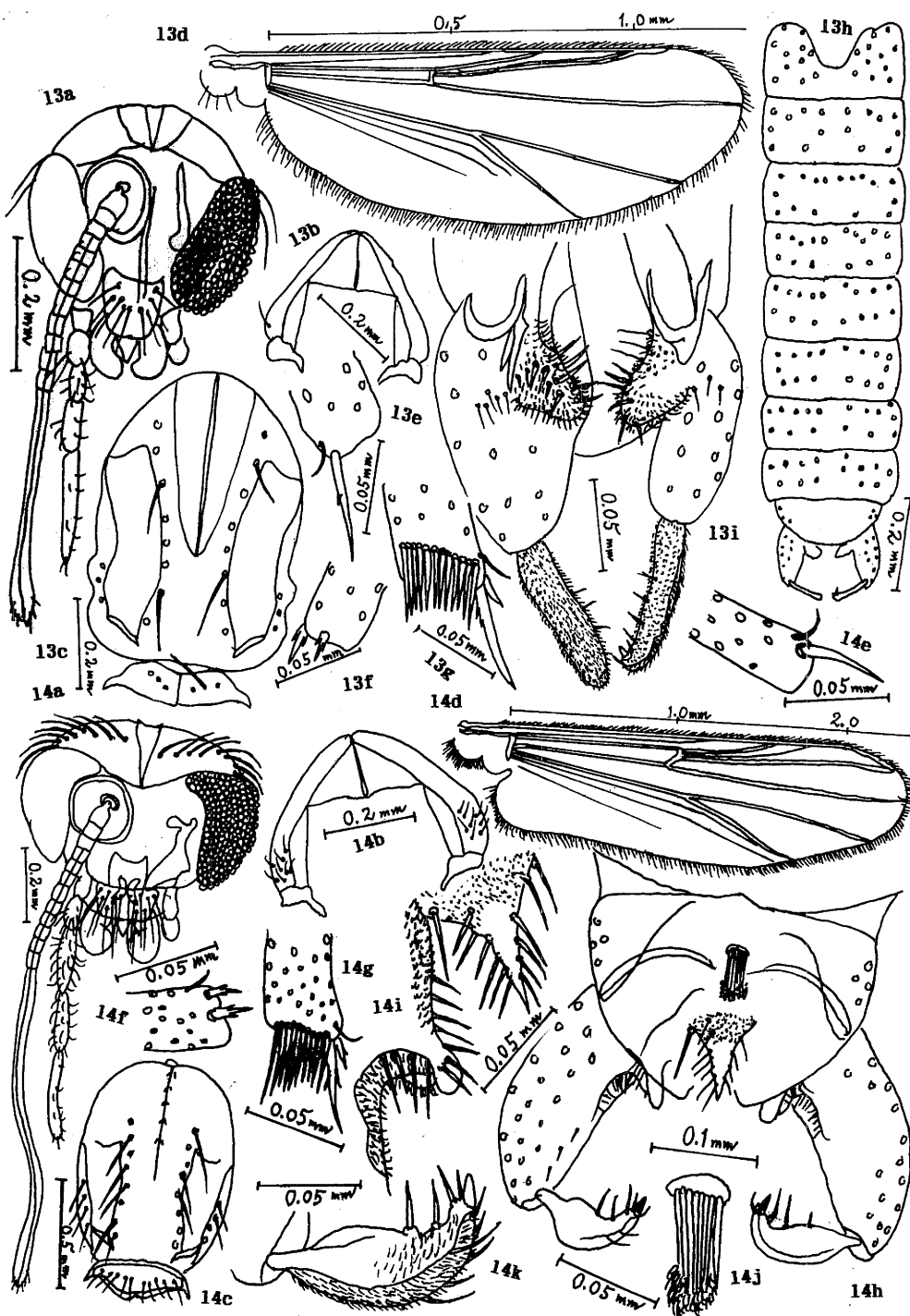


Fig. 13 *Eukiefferiella tokaralemea* Sasa et Suzuki, 1995
Fig. 14 *Orthocladus glabripennis* (Goetghebuer, 1921)

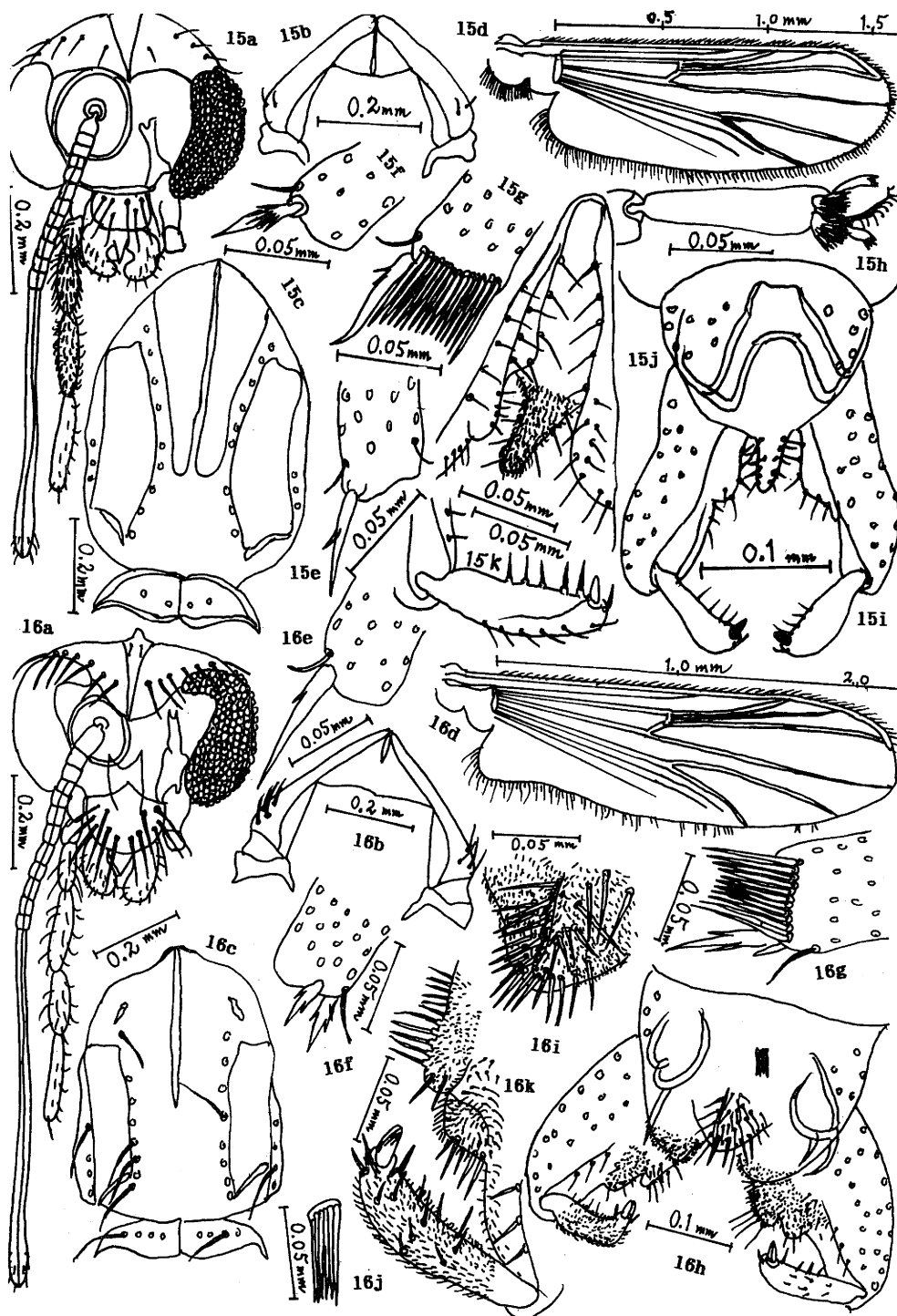


Fig. 15 *Psectrocladius gotoheius* sp. nov.

Fig. 16 *Setukoyusurika gotoheius* gen. et sp. nov.

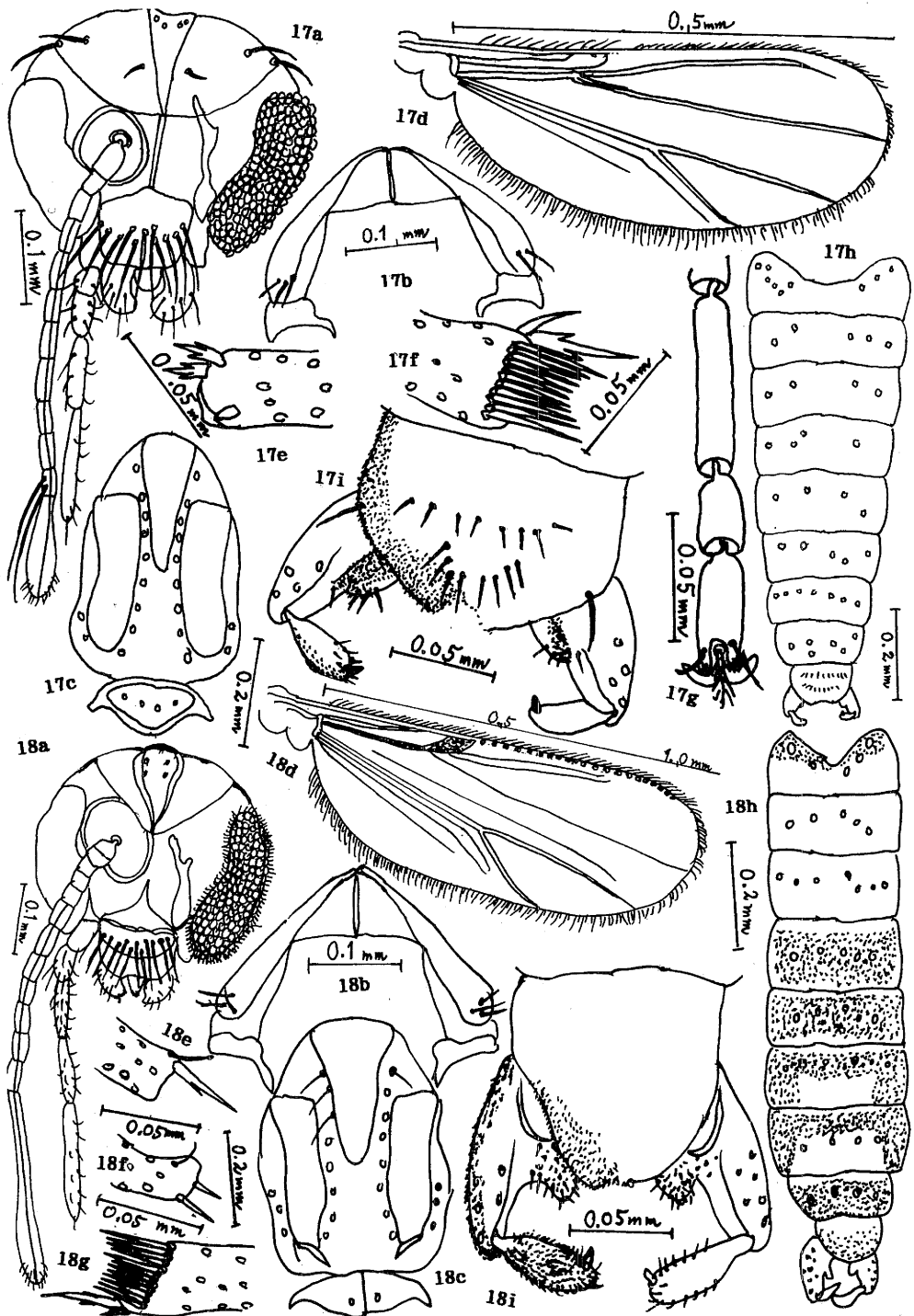


Fig. 17 *Thienemanniella nipponica* (Tokunaga, 1936)
 Fig. 18 *Thienemanniella gotopallida* sp. nov.